



# Newsweek

# P R E M I E R

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### DOOM BOOM

According to a 2012 poll done for the National Geographic Channel, 9 out of 10 people surveyed expect a world disaster to occur in the next 25 years; 44 percent said they are ready.



# Prepping for DOOMSDAY

Survivor Jane Austin and her husband, Rick, shed light on how to be ready for TEOTWAWKI—The End Of The World As We Know It.



#### DEAD SET

In Season 3, Episode 1, "Seed," Rick Grimes (front, center) leads a team of post-apocalyptic survivors as they cover each other's backs, to make a walker-free haven in an abandoned prison.

#### 6. Smelling is seeing.

In Season 1, Rick and Glenn (and four seasons later, Carol) shambled among walker herds after covering themselves in zombie guts to disguise their human scent. Effective hunters often use both clothing and scent as camouflage and lure. Smell can be a deterrent, too: Some farmers employ coyote urine and human hair to protect their food source from rabbits and deer.

#### 7. Shelter isn't always safe.

Don't assume an already-standing structure is perfectly safe and pest-free. Look in all the nooks and crannies for dangerous surprises before you hang your hat. Remember the Tombs in Season 3?

#### 8. Gather food where you may.

No, not like the Terminans. (RIP, Bob's leg.) But do look beyond the grocery shelves. Like Father Gabriel's basement stash from the food drive in Season 5, a termite mound can be a

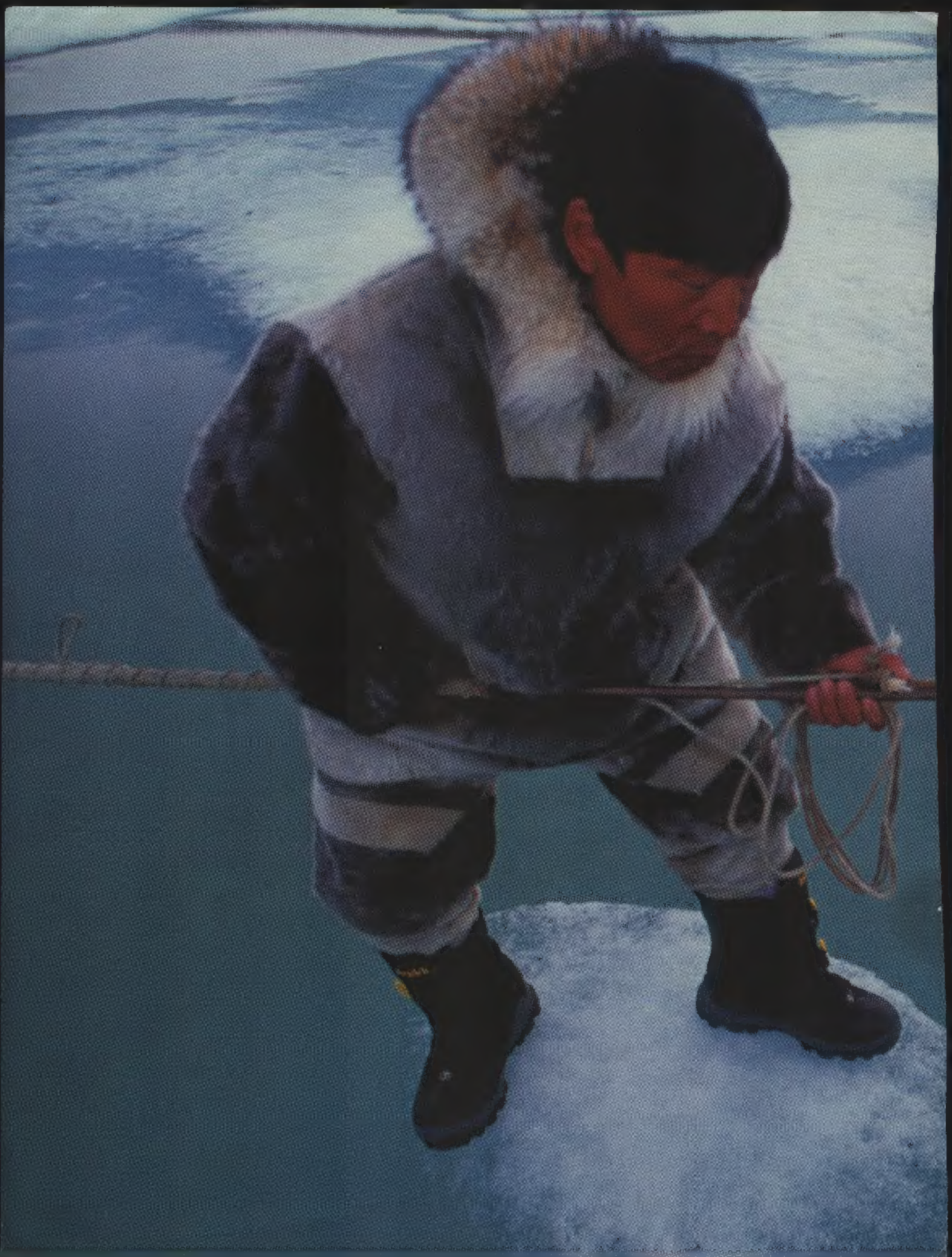
much-needed protein source. Just make sure it's a non-toxic, uninfected source first. (RIP, Bob.)

#### 9. Learn how to wield your tools.

Things like fire starters are a lot less surefire if you don't have practice using them. Think back to Shane's gun training sessions near Hershel's farm in Season 2. They're what made Andrea go from not knowing how the safety works to being a stone cold shot the night of the fire. Patricia, on the other hand, could have used a little more learning.

#### 10. Be aware of your surroundings.

As they walked into the unfamiliar Terminus in Season 4's finale, Rick noticed that one Terminan was wearing Daryl's poncho and another was holding Hershel's pocket watch. Trusting your senses can sometimes mean the difference between being the hunter or the hunted.



# 10 Things I Learned From **THE WALKING DEAD**

Though all five seasons of the show are fiction, the survival strategies are real. So are the spoilers.

## **1. Know when to make some noise.**

When you're exposed without shelter, put up noisemakers around the perimeter of your camp site to alert you to trespassers—animal or otherwise. Empty tin cans tied on a string work. Bob, Sasha and Maggie used this pretty effectively in Season 4, when they were back in the wild following the Governor's devastating prison onslaught.

## **2. Use whatever you've got on hand to get the job done.**

Walkers don't stop coming just because someone's left their knife in their bunkroll. *Walking Dead* survivors have dispatched zombies using screwdrivers, boot heels and a machete scabbard, and Rick took out a living villain using just his teeth. Daryl Dixon even used a walker's skull to bash in an attacker's. If you're in a survival situation, you'll need to use whatever works, too. Sticks become shovels, socks become water purifiers, and so on.

## **3. Make your own luck.**

Don't stay in a dangerous situation and hope to get rescued. But also don't discount an SOS. Communicate however you can. Exposed because she was walking along train tracks in Season 4, Maggie wrote Glenn notes in zombie blood and guts alerting him to her direction—and kept walking.

## **4. Always make sure your water supply is clean.**

After all those gunfights and herds of walkers, it was Patrick's sneezing over the water barrel in the opener of Season 4 that nearly took down the entirety of Rick's crew.

## **5. There is strength in numbers.**

There's something romantic about you against the world, but you might not want to go it alone. Loners tend to go a bit nuts. Rick and company are pretty good at keeping their "people" in one piece. Plus, in a group, as Hershel said, "Everybody's got a job to do."

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A person wearing a dark hooded jacket is sitting in profile, looking towards the left. They are illuminated by the warm, orange glow of a campfire. The background is dark, with a small fire visible in the distance. The overall mood is quiet and contemplative.

## DEGREE OF SEPARATION

The average campfire reaches about 930°F after burning for three hours—nearly hot enough to melt silver. At those temperatures, a hand will begin to feel too warm after only a few seconds.

# SURVIVORMAN

## Essentials



**Les Stroud—a man who's spent the last decade confronting the wilderness alone with only his skills and a camera—holds forth on zones of assessment, wind and the unsung power of a hunk of cheese.**

We can handle the pouring rain all day. Oh, now you have a canoe mishap and you're at the side of the river. That's two lemons. Not such a big deal. All you've got to do is dry off, repack the canoes and head downstream. But, if, out of that dumping in the river, somebody broke an ankle, that's three big lemons. Three big, fat lemons. And, usually, on the third, that's when it's like, "We have to do something about this." Those three lemons pop up and change what you're gonna do.

**You've also said that in a survival situation you should keep moving. Why?**

The whole "stay put"—that's a bit of an outdated thing. You have to start thinking, "OK, first of all, does anybody know where I am? Is anybody expecting me? Will somebody come looking for me—yes or no?" It's a big

rain's coming in, you're running out of food, somebody's injured, you're a long way from home, nobody's expecting you—no. You need to get up off your butt and start proactive survival.

**You decide to make a move. Push forward or retrace your steps back?**

Sorry to premise every single answer with "it depends on the variables," but it does. I would say, more often than not, retrace your steps back out. The problem with moving forward is you are moving forward into the unknown. It may be like, "Oh, my God. It's 50 miles." Yeah. But you know that 50 miles.

**What is the essential thing I can do to give myself the best chance of getting out?**

I'll give you three. My number one thing of all, in all different

without MapQuest. How to tell East from West, and how to walk in a straight line through the wilderness. And number three, know how to keep yourself warm. If you're in a cabin and you've gotta travel somewhere and you don't have a coat, are you gonna think smart enough to put newspapers in your pants? Are you gonna wrap your hands in a rag filled with moss? Those three skills together will do you very well.

**How do you walk a straight line in the wilderness?**

It's not easy. You can get turned around so easily, and we tend to favor our right leg, so we do these big circles. One little trick is, if I look straight ahead and between here and there is a bunch of trees, I purposely go around the right side of one tree and the left side of the next tree, right side of one tree, left side of the next tree. And that kinda sorta keeps you a little straight. Another way is, if the sun is shining, and you're walking this way, and the sun is basically positioned just over the right edge of my right eye, well, let's keep it there. Of course it'll move. But generally speaking, I can keep it like that for the next 15 or 20 minutes and be in a fairly straight line. OK, now it's going to be on my temple. Now I'm going to have it on my temple for the next 20 minutes or so. And so on.

**What don't you leave home without?**

I always make sure I've got a surefire way to get a fire going.

**"It's not about, 'Well, I'll just be gentle and wait here and everything'll be alright.' No, no, no, no, no."**

variable, but I personally believe surviving is a proactive endeavor. And, everybody that I've ever seen learning survival under my tutelage that is extremely passive does very poorly. It's not about, "Well, I'll just be gentle and wait here and everything'll be alright." No, no, no, no, no. Storm's coming in, weather is coming in, cold's coming in,

types of situations, whether I'm in a desert or a jungle or the Arctic—get a fire going. It changes everything. You feel better, it scares the boogeyman away, it purifies your water, cooks your food, keeps you warm, creates light for you. Another one is understand and learn navigation—without a GPS, without an iPhone,

**You're Canadian, so, say you're stuck out in the cold. What do you do to keep your body heat up?**

Right away, you have to determine if it's windy. Wind is a deadly, deadly force when the temperatures are cold. And that doesn't matter whether you're in the city or in the wilderness. Getting out of the wind will improve your circumstances 50 percent right away. Any way you can devise to protect yourself from the wind, whether you're banking up snow or using branches or dropping down into a gulley. The point is: Get out of the way.

**What's so bad about wind?**

It sucks all of the heat right out of you. And on the subject of losing heat, sitting down on a cool ground sucks the heat right out of you, too. So does leaning up against a cold wall. We want to get heat back into our bodies. Jumping jacks help. I do push-ups a lot. Moving should be an obvious way to generate heat within your muscles. The difficult part is you can't do jumping jacks all day long. But you can pace it out. Every 20 minutes I'll drop and do 20 or 40 push-ups in a cold scenario. A way to get warm right before bed—I always advocate this—have a couple of good chunks of cheese. That will burn in your belly all night long and create internal combustion that heats you up while you sleep.

**What predicament is more difficult for survival—extreme heat or extreme cold?**

With extreme heat, you can duck behind a sand dune, hide behind a tree, wait out the heat of the

day, work at night. When it's cold, you cannot stop. You have to keep moving. You have to keep affecting your survival. You have no forgiveness. And you must always be doing something about the fact that it's cold. People often ask me where the toughest place in the world to survive is, and I always say it's not at all about geography, it's about temperature.

**What is the first thing you need to find in a survival situation?**

The very first thing is you must calm down. It doesn't matter what the circumstances

**"When it's cold, you cannot stop.... You have to keep affecting your survival. You have no forgiveness."**

are. The next thing you need to do is to find a way out of those circumstances. How are you going to do that? Well, you're going to do that by first acquiring knowledge, second by making a decision and third by acting on it. Now, let's walk through the three zones of assessment. The first zone is what do I have on my body or in my pockets? What am I wearing? What's useful for me? And that also includes your physical shape as well. Oh, I've got a broken wrist. Oh, I snapped my ankle. Zone of assessment number two is what's in your close surroundings. OK, well, my backpack's right here beside a tree, and it's got a tent in it, and I know I can wait out

the night if I have to 'cause it's gonna start getting dark. Zone of assessment number three is knowing what's further afield. About half a kilometer up river, we passed a cabin. And I actually remember looking at the map, and I know that if we walk east for half a mile, if we just stay straight and walk east, we have to hit a road. Now, all of this questioning really only takes about 90 seconds. In about a minute and a half, you've ascertained all this knowledge. Well, now that you've got all this knowledge, and you're sitting down and calm, you can

say, "OK. Here's what I think we should do." Maybe it's build a shelter and stay the night. Maybe it's get the hell out of there. Maybe it's try to signal for help. It's a thousand different variables of what you're going to do. However, at least you're now going to do it with knowledge enough—and, you know, knowledge is power.

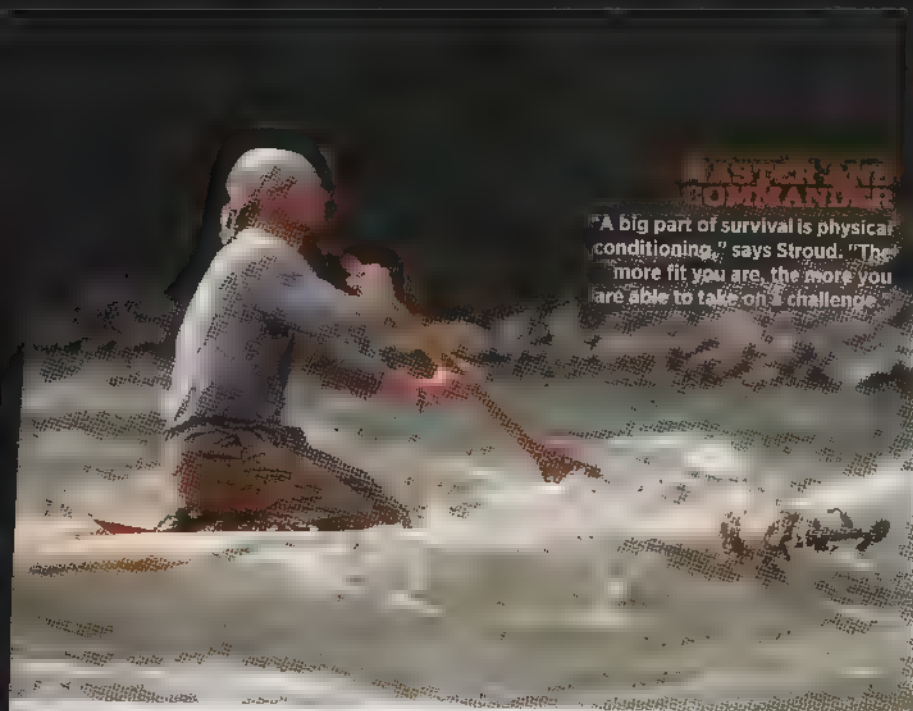
**You've said: "When you have three lemons, get out." Where does that rule come from?**

It's something we actually used to say when I was a guide. Obviously, it's a rough rule of thumb and variables matter. But if you're out there and it's pouring rain all day—boom, there's a lemon right there. But, whatever.

### ON THE ROAD

There are 46,837 miles in the U.S. Interstate system. Of these, the longest single piece of road is I-90, which runs from Seattle to Boston—a distance of 3,020.54 miles. Only Alaska doesn't have a single mile.





It's a butane-filled lighter with kind of a torch-end on it. If I want a fire, I want it quick. I don't wanna be rubbing sticks together. Always a shelter. Even if it's a big orange garbage bag folded up small and shoved in a side pocket. Believe it or not, a flashlight. I don't like being caught in the dark. The other big thing is something to boil water in. To me, I'd rather have a pot I could boil water in than a knife.

**What are some of the most valuable lessons you've learned from native peoples?**

I've never been about, "It's me up against nature, up against the wild." That's not what this is about. It's learning how to work within the rhythms of the wilderness and within the rhythms of a natural environment. And a lot of native cultures reinforced and taught that. The reality is we cannot beat nature. No matter what we think and how powerful we get as human beings, we can't beat nature. One hurricane comes in and destroys all our hopes and dreams.

**What are some of the bad things that maybe are hidden, or people just wouldn't think about?**

A completely underestimated one that is very insidious is lack of sleep. You're scared, so you stay up all night, then you push through the day. And then you are making bad decisions and doing foolish things. You know what? You got a moment here during the day, the sun is shining—why don't you grab three hours of sleep? Otherwise, it's the small things. It's the hornets' nests and the biting ants and the little beehives and the little stinging caterpillars, or whatever. Those things are a lot more of a hassle to you than a jaguar or a lion or snakes or something like that. Those little guys are the guys to watch out for, for sure.

**What do you think is the number one mistake that newbies to the wild make?**

The biggest I see is the mindset that "It can't happen to me—we're not gonna be the ones who have a canoe upset; I'm

not gonna be the guy who gets turned around in the forest and loses my way on the trail." And the problem with that mindset is that you don't pack properly. You don't prepare. And another huge part of this is taking responsibility for ourselves. You can trust your guide, you can trust your friends, but rely on yourself.

**What's the most scared you've ever been?**

I hesitate to use the word "scared," but I don't mind using it in this one instance. It's a long story, but the reality is, I was out in a survival situation, viewing some moose, and I ended up having a 1,500-pound bull moose with a full rack of antlers chase me through the forest. I ended up going up a tree, and then I had to jump out of the tree at some point and run away from him some more. And then I had to climb into the lake and sneak up the shoreline under the water. Moral of the story: I am really good at survival. So why could this happen to me? I got cocky. You know that phrase we use nowadays, "Eh, I got this." Well, when you use that phrase in a survival situation, you are about to experience trouble. It happened to me in the Norway episode. Going down that hill to the fjord, I could've died from hypothermia. It was one of the most dangerous situations I've ever had. Why? Because I thought to myself, "Ah, it's just a walk down the hill to the fjord. I got this." And I screwed up.

#### ON LOCATION

During the second season of his television series *Survivorman*, Les Stroud walks across the Kalahari Desert in Africa, on the lookout for scorpions.

# 08

## Shelter

One of the basic human needs is to stay warm and dry. But efficient sheltering goes beyond structure, from building a fire-lay to communicating to harnessing a source of energy off the grid.

# 38

## Sustenance

Three days without water can spell disaster in a survival situation. There's a bit more time to gather food. But truly sustaining life takes savvy, research and a plan for sustenance far beyond the grocery shelves.

# 66

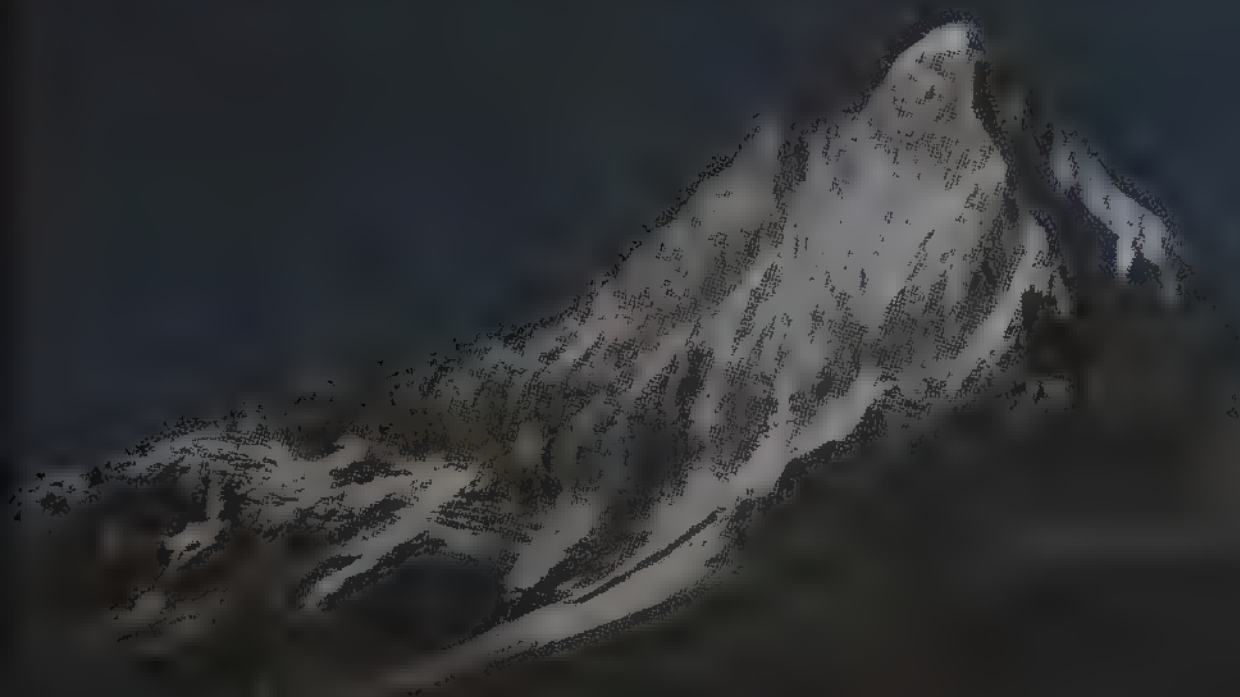
## Survival

Man versus nature is a lopsided struggle humans aren't intended to win. Special Ops members, doomsday preppers, *The Walking Dead* and *Survivorman* himself offer useful tips to even the odds.



OFF THE GRID

# SHELTER



**Most people know about Bug-Out Bags, or BOBs, but what are other essential prepper terms?**

**SJ** TEOTWAWKI is an acronym for "The End Of The World As We Know It" and it also has a pronunciation: Tee-ough-te-walk-ee. Then, there is GHB (Get-Home Bag), the INCH (I'm Never Coming Home) Bag, SHTF (S---t Hits the Fan), EMP (Electromagnetic Pulse), BOL (Bug-Out Location), BOV (Bug-Out Vehicle), SA (Situational Awareness), PD (Perimeter Defense), GOOD (Get Out Of Dodge)—the list goes on.

**What are most preppers prepping for?**

**SJ** Asking what people are preparing for is like asking a group of people to describe the color blue. Our mantra is you prepare for one, you prepare for all. It's best not to be event specific in your preparedness or you may find yourself caught off guard.

**R** It almost doesn't matter what the disaster is, because it is just a catalyst. If any disaster goes on long enough, the results will be the same: a lack of food, water, power and shelter for the unprepared. It is also important to understand that in today's computerized age of "just in time delivery" there are less than three days' inventory on the shelves of any grocery store.

**Why is it important to prepare?**

**SJ** We prepare because we don't want to find ourselves sandwiched in a gymnasium for shelter or waiting in line for water after a disaster. By having

the necessities, you won't have to worry about someone coming to "save" you.

**What led you to adopt the preparedness lifestyle?**

**SJ** It was an epiphany for me. The incident that got my attention was when I was almost carjacked at gunpoint by two armed men who had just robbed someone at an ATM machine and were looking for a getaway

**"By having the necessities, you won't have to worry about someone coming to 'save' you."**

vehicle in broad daylight. That was the day my sense of security was ripped from me. I also realized that I needed to start being accountable for myself and began researching what it really meant to be "prepared."

**R** I have always had a survival and preparedness mindset. I grew up in New Hampshire where you could lose power for a week at a time due to an ice storm or blizzard. So you learned to cook with wood, heat with wood and store your food out in the snow. I also lived for years in Florida, in the hurricane and lightning capital of the world, where you could lose power for weeks at a time, but in that case it was 90-plus degrees and 90 percent humidity. If you weren't prepared, you were a victim, so you learned to be prepared.

**It can seem overwhelming. How do you get started?**

**R** Learn all you can. The Internet is a great resource while it is still here. Create your own prepper library. Of course, you can't read them all now, but you will be glad that you have resources on how to fix things, grow things, preserve things and how to deal with medical issues when you need information most.

**Why organize prepper camps to instruct others?**

**R** Some might say that we could be better off if we kept quiet, hid away and didn't tell anything to anyone. But the lone wolf approach is not so easy. In a really bad disaster situation, there is too much to do and not enough hours or people to do it. So you need division of labor and extra hands. And you might say that, selfishly, we know that the more people we can teach to fend for themselves, the less we have to worry about them trying to take our stuff.

**What does the ideal off-the-grid outpost look like?**

**R** I like a rural setting, because, first of all, you have the right mindset of people who are surrounding you. Just like in any military study on defensive

positions, the strategic high ground is the best. As part of my Secret Garden of Survival food forest, I have planted natural barriers and obstacles such as blackberries, Osage orange and other thorny "green fences" around the perimeter of my property. Water on the property is also a key feature. The soil and rainfall should be enough to be able to grow crops.

**What's the most useless thing people think they need in their bug out bags?**

**R** It's not one thing, it's too many things—too much weight. Just try walking five miles with your BOB. Most people can't walk to the end of their driveway with it on. You need to have things that can serve multiple purposes.

**On the flip side, what's the main thing new preppers forget to have or do?**

**SJ** Hygiene! Infectious disease is the number one cause of death worldwide. It is imperative that we have the means to keep ourselves clean and infection free.

**So what are your three must-have items for bugging out?**

**SJ** A poncho is one of my favorite items to have in an emergency bag because it is so versatile. It can be used as a tent, for warmth and to catch water for drinking. Another is a knife. You can hunt small game, prepare food and use it for protection. A lot of people who are just getting into preparedness get caught up in buying stuff with no thought



in mind. The focus should be on basic needs of water, food, shelter, protection, warmth, communication and first-aid and go from there. Oh, and my last item: rope and/or paracord. **R** One of the most overlooked items is a hat. As they say in the cold north, "If your feet are cold, put a hat on." Also, if you are in the woods, a hat keeps the creepy-crawlies out of your hair that could bite and cause infection, and it can be used to collect and, yes, even boil water by putting heated rocks in your hat.

**What's the single biggest mistake that rookies just starting out make?**

**SJ** I always caution, "Don't buy and not try." Which is to say, don't buy all this survival gear and then shove it into your go-bags or garage.

**R** You can't just have gadgets and think you are going to be OK and survive anything that comes at you. What you need more than anything is practice. You need skills. Don't think you can buy seeds and then can grow a garden when you need it. That is folly.

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# 3 INFECTIONS DEADLIER THAN

By John Teator

## W

hen you think of infectious diseases, you probably think of the flu, Ebola, or HIV. But there are many more out there, and some are more deadly than others. In this special issue, we'll look at three of the most dangerous infections you can catch: Influenza, MRSA, and HIV/AIDS. We'll tell you what they are, how they spread, and how to prevent them. So you can stay healthy and safe, no matter where you are.

## Influenza

More commonly called the flu, this viral infection attacks

the respiratory system and many strains

**Up to 49,000:**

**200,000-plus:** Hospitalizations per flu season in the USA

**6 feet:** Distance you should stay away from someone who is sneezing and talking

**Symptoms:** Fever, cough, sore throat, and body aches

**Prevention:** Cover your mouth

but effectiveness depends on age and health of the person, as well as on which strains are prevalent

## MRSA

Methicillin-resistant *Staphylococcus aureus*

that's resistant to common antibiotics

**15,500:** Avg. deaths per year

**94,000:** Hospitalizations per year in the USA

**Spreads:** Mostly in healthcare settings, but also via skin-to-skin contact

**Symptoms:** Skin infections, abscesses, and sometimes systemic infections

**Prevention:**

## HIV/AIDS

Deficiency Syndrome is a disease spectrum that weakens a person's ability to fight off infections, diseases, and tumors

**15,500:** AIDS-related deaths in USA in 2010

**1.1 million-plus:** Americans living with HIV

**1 in 6:** People don't know they're infected

**Spreads:** Via bodily fluids, such as blood, semen, vaginal fluids

**Myth-busting:** Can't be spread through "casual" contact like handshakes, hugging, or insect bites

**Prevention:** HIV is commonly preventable with the right steps and sharing a needle

Centers for Disease Control

[www.cdc.gov](http://www.cdc.gov)

National Institutes of Health

[www.nih.gov](http://www.nih.gov)

World Health Organization

[www.who.org](http://www.who.org)



**BUILDING THE BEAST** To be ham-ready, you'll need (clockwise, from left): a car battery; coaxial cable; twin lead line; copper wire; and a radio (here, the Yaesu FTDX-5000).

use. Only if they pass will they get a call sign and unfettered access to the airwaves. Once a ham, though, an operator is able to make contact anywhere, anytime. "From San Diego to the Falkland Islands, from New York to Tokyo, from you-name-it to you-name-it," says Ristorcelli. "Using moon bounce, a ham can transmit a signal to the moon and have it reflect back to the Earth. That lets you talk from pole to pole." There are some 3 million licensed hams throughout the world, excluding only North Korea, which does not permit amateur radio operation. It can even stretch up to the International Space Station, where there are fellow ham operators on board.

At the beginning of the decade, there was a network of just more than 700,000 ham radio operators in the U.S. The network isn't just folks with a car battery, an antenna and a will to take communication into their own hands. There are ongoing responsibilities that come with being a ham operator, too. Broadcast radio gained popularity around 1900. That led to the government having a hand in the control of the electromagnetic spectrum. In 1914, Hiram Percy Maxim founded a coterie of hams called ARRL (American Radio Relay League) and successfully argued that they should be allowed to be exclusive users of the long-range bands of the electromagnetic spectrum. They still are. Ever since, the ham community has been strictly following a code of behavior to remain deserving of the bands—for example, you have to stop talking every three minutes and identify yourself every ten minutes. And

ham radio's savvy operators have provided some unexpected boons to communication in the century since ARRL's founding. Real-time battlefield location, called Blue Forces Tracking, is based on the Automated Packet Reporting System (APRS) developed by call sign WA4PRS.

Ham radio itself has developed quite a resume in dire situations. "Ham radio isn't the only solution to the world's problems, but it is a resource," says Ristorcelli. He adds that during 9/11, it was ham operators who opened up communications when New York City's cellular and other conventional communications systems collapsed. The benefits, according to Ristorcelli—who personally helped locate a stranded victim of Hurricane Katrina via radio from California—are "that independence, resiliency, that thinking ahead."

It's a case of use it or lose it when it comes to the attendant radio skills required for when things go bad, warns Ristorcelli. "A lot of people get their technician's license because they figure this is a way to be in contact with people in an emergency. So they get a license, they go to a store and get one of those handheld radios, they put in the glove compartment of the car so that the day of the earthquake, they can call mama. But they don't know where the repeaters are and what the repeater frequencies are. They haven't established contacts."

"You can only make it effective if you plan for it in advance, and if you use it," adds Ristorcelli. "Plus, it probably has dead batteries, so it won't work anyway."





**CURRENTS** Navigating a small body of water can turn deadly, according to Miller, because the water may be deeper than expected or hiding a swift current. Travelers carrying heavy gear on their backs can drown, and those who make it back to dry land can find themselves soaked and vulnerable to exposure, he adds. It's always better to go around, he says, but if one must cross, do so at the stream's widest point—that's where the current runs weakest.



### YELLOWBEARD SNAKES

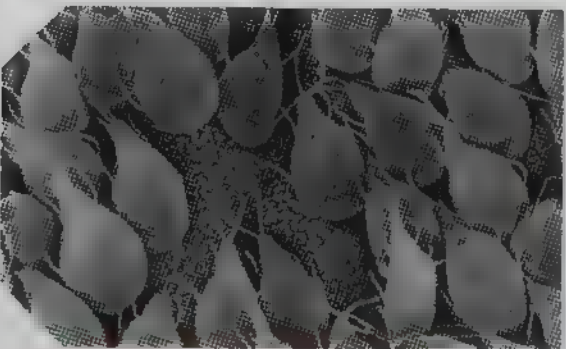
This pit viper native to South and Central America grows up to eight feet long and prefers to spend days in the jungle underbrush, where it blends in with the foliage. When night falls, the serpent slithers out in search of prey—and displays a more aggressive personality than snakes more familiar to North Americans. "Its venom is really quite fatal," says Siddall, causing widespread hemorrhaging and renal failure.



**LIGHTNING** One bolt can unleash up to 1 billion volts on the Earth's surface. Anyone unlucky enough to get caught up in a storm should immediately seek the lowest ground possible, such as a ditch or depression, says Miller. Squat on a sleeping pad if one is available to avoid the current from nearby strikes traveling through the ground that can cook you from the feet up, he adds. "Then put your hands over your ears, duck your head into a lower profile and pray."



**FLASH FLOODS** These sudden rushes of aquatic fury have been known to sweep entire vehicles away. Keep an eye on the sky for sudden downpours, especially when traveling through slot canyons, by river banks or near any other natural channels for the torrents, says Miller. If you get caught, all hope is not lost. "Keep your feet forward when floating and try to get behind an obstruction, like a big stone, that will deflect the water," says Miller.



**GIARDIA AMOEBAS** Usually found in bodies of water contaminated with feces and invisible to the naked eye, giardia microbes hide within a protective cyst casing, making them impervious to most water filtration methods, says Miller. If you drink them, the ensuing dehydration from diarrhea can disorient you and lead to deadly mistakes. "It's that cascading effect where dehydration leads to acts of poor judgement and then accidents," says Miller.



**DEAD BRANCHES** A tree may look inviting to the survivalist looking to set up a lean-to shelter, but its branches may house what bushmasters often call "widowmakers," says Laskowski: a branch that just broke off during a storm and is hanging above. The widowmaker is poised to crash down upon its victim and, depending on the height of the tree and the size of the branch, says Laskowski, could cause serious injury or possibly death.

# CACHE-ING IN

You know ammo, bottled water, matches, gasoline and toilet paper will disappear first if things go south. Here's 38 must-have items that will also be hard to come by.

**1. Vitamins**

**2. Big dogs**

**3. Medical, gardening and survival guides, including the *Boy Scouts Handbook***

**4. Salt, honey, syrups, sugar**  
Not just for flavor—you need salt to preserve meat.

**5. Coffee and tea**

**6. Cast iron cookware**  
It's tough to carry, but it's also durable and can be used over an open fire.

**7. Duct tape**

**8. Cooking oils**  
To keep food from burning

**9. Garden seeds**  
Along with the tools you'll need to grow them, like spades and hoes, gloves and potting mix.

**10. Manual can openers, egg beaters, mixers and whisks**

**11. Canning supplies**  
Jars, lids, wax and other essentials to preserve any fresh food you might find or grow.

**12. Water containers**

**13. Feminine hygiene products**

**14. Baby supplies, diapers and formula**

**15. Glue, nails, nuts, bolts, screws**

**16. Insulated ice chests**  
For keeping items from freezing in frigid temperatures.

**17. Pillows, mats, cots and inflatable mattresses**

**18. Plastic wrap and home insulation kits**



**19. Bleach**  
Make sure it's not scented and is 4 to 6 percent sodium hypochlorite

**20. Bicycles**

**21. Laundry washboards, mop buckets with wringers, clothespins and clothesline**

**22. Garbage cans and bags**  
For trash, yes, but also for storage, water collection, hauling goods, etc.

**23. Aluminum foil**

**24. Board games, cards and dice**

**25. Propane, plus heating and lamp oil**  
Also, cylinder handles or holders: Propane canister use is dangerous without something to secure it.

**26. Baking soda**  
For putting out fires.

**27. Fishing supplies and tools**

**28. Mosquito repellent**

**29. Condoms and other means of birth control**

**30. Hygiene products, including nail clippers, soap, wet wipes, dry shampoo and hand sanitizer**

Keeping as clean as possible is important for health, and showers are going to be few and far between—if at all.

**31. Scissors and sewing supplies**

**32. Warm clothes and outerwear, plus hats, boots, gloves, socks and underwear**

**33. Reading glasses**

**34. Journals, diaries and scrapbooks**  
You'll want to jot down ideas, feelings and experiences and preserve information for future generations.

**35. Hand pumps and siphons**

**36. Motorcycles**  
They are easy to maintain and gas goes a long way.

**37. Bibles**

**38. Liquor and cigarettes**  
Social, medicinal and for bartering

# MEDICAL TIPS

often the only doctor for miles is you.

## ● BREAKS AND SPRAINS

**T**HE reason instructors like Johnson use the term “musculo-skeletal” in regard to injuries in the backcountry is that it often doesn’t matter if you’ve broken a limb or sprained it. “We don’t have an x-ray or an MRI handy so you don’t know if it’s strained or sprained or fractured, but you do know if it’s usable,” says Johnson. “There are strains or sprains that can render your foot useless. And, likewise, there are breaks or fractures that still allow you the use of the extremity or limb. It all comes down to usability.” Johnson

recommends assessing usability before administering any type of first aid.

“Focus on the particular injury,” he says. “If it’s an ankle, you ask, ‘Can you stand on it? If so, how much weight? Can you move it? Could you write the alphabet with your foot?’” If the answers to these questions are a combination of “sort of” and “maybes,” it might be appropriate to try to fashion a splint. Still, listen to your patient—or your own threshold for pain, if the patient is you.

“If you put a splint on your friend’s ankle and a half-hour later they say, ‘I can’t feel my toes,’ that’s good feedback that

you’ve tied the splint too tight,” says Johnson. “If they say, ‘It’s moving around a lot and it hurts,’ that’s good feedback that can help you recognize, ‘OK, maybe I need to make sure it’s doing a better job of immobilizing the affected part,’” says Johnson.

“Whatever you have with you in the moment or in your first aid kit or pack or raft is usable [as a splint],” says Johnson. “You want something that will immobilize the affected area but you want to have it be padded and you want it to last. Maybe that means using a tent pole or some sticks or your ski pole or the paddle for your kayak or canoe.”

### SPLINTING 1-2-3s

1. Immobilize the affected area with something rigid.
2. Fasten the rigid piece to the affected area with tape or rope, ensuring that it’s secure but comfortable.
3. Check in with your patient every hour and adjust tightness as necessary.

### PADDING

Experts suggest padding unconventional splints before applying, to avoid discomfort.



# Hidden Dangers THAT COULD KILL YOU

From microbes to pebbles, the natural menaces you might never see coming.

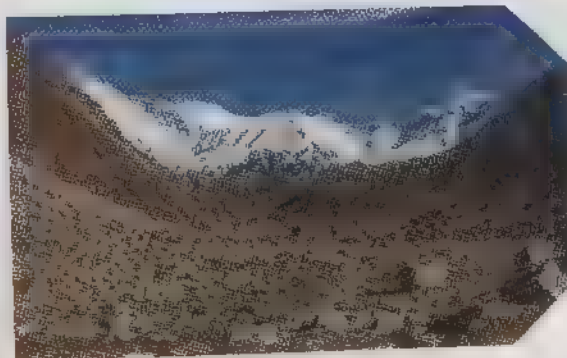
**W**HILE MOST people trekking in the wilderness might worry about a hungry 700-pound grizzly bear or an avalanche, danger most often sneaks up on even experienced travelers in far more innocuous-seeming and far tinier—even microscopic-sized—packages. Dr. Mark Siddall, curator of the exhibition "The Power of Poison" at the American Museum of Natural History, Tom Laskowski from the Midwest Native Skills Institute and Gregory Miller, president of the American Hiking Society, point out the hazards you might not even know to look for—or be able to see with the naked eye.



**YELLOW JACKETS** Even the cautious could overlook the nests of these aggressive wasps; they sometimes conceal them underground. "Turning over a log that has a yellow jacket nest in it will guarantee a bad day," Siddall says. The wasps tend to act aggressively during late summer, when hive population peaks and food supply runs low. A full-scale barrage of stings can cause renal and respiratory failure in anyone unable to escape the swarm.



**FIRE ANTS** These tiny insects have established a vast empire in the southern U.S., spanning 310 million acres from California to Virginia. One careless kick of a mound could unleash a swarm. "Fire ants are pretty aggressive," says Siddall. They grab victims with their mandibles then inject venom with stingers. While a sting or two leaves an irritated bump, thousands can overwhelm the body's immune system, constrict airways and lead to death.



**PEBBLES** After the glaciers sanded down giant swaths of the Earth's surface, they left mounds of rubble in their wake called moraines—basically large areas of land covered with loose pebbles and soil. One slip of the foot can send the hiker plummeting, says Miller, likening it to "walking on marbles." He recommends a good pair of hiking boots to mitigate danger. Skrees, collections of small rocks at the bottoms of cliffs and crags, can be similarly slippery.



### Amazonian Tradition

A Matis tribesman in Brazil, who numbered as few as 87 in the 1980s, walks on a smoking canoe hull near the Amazon River. Heating the canoe over a fire makes the wood malleable, and it is then stretched by jamming wooden slats inside.

# Do-It-Yourself

When you're committed to living off the grid,

## FLESH WOUNDS

**W**HILE it's possible, but unlikely, you'll

fall victim to a wild boar or mudslide when exploring the wilderness, you could easily get a gnarly infection, and those can kill you as dead as any beast or boulder. "The National Outdoor Leadership School (NOLS) has been keeping records of injuries and illness in its programs for 30 consecutive years," says Marco Johnson, Field Staffing Director for NOLS. "Sprains and strains and soft tissue injuries are much more common than dramatic fractures or dislocations, and diarrhea and flu-like symptoms are much more common than the exotic pulmonary edema of altitude or snake envenomation."

To wit, the wilderness medicine courses taught at NOLS emphasize cleanliness as a means to good health. "It's important to have good hygiene, to wash your hands, to clean your dishes and to treat your water," says Johnson. "That works well if you're on a two-week backpack expedition, working disaster medicine or living fully off the grid."

The "keep it clean" principle transfers to flesh wounds as well. "The idea behind wound care



is stop the bleeding, promote healing and prevent infection," says Johnson. "If you don't do those things, all of a sudden you end up with an infection that's significant. Read Hemingway's *The Snows of Kilimanjaro*. That's the far end of the spectrum. It could happen, but only because you're not taking care of it."

Johnson also notes you needn't worry about access to fancy antibiotics. "A small irrigation syringe is perfect. They cost about \$1," he says. "If you get a cut or scrape, stop the bleeding, then wash it. You don't need special lotions or potions. Just do a really good job of dressing it and caring for it. Use drinking quality water and the cleanest bandage.

Then clean and dress it again when it looks dirty."

Johnson notes that the most important thing you can bring with you into the wild is knowledge. "Having a basic first aid course is critical," he says. "Then you're able to monitor your patient and understand if they are getting better, staying the same or getting worse. Those are your decision points. If they're getting better? We can stay and deal with this. If they're getting worse, that let's you know it's not good and that you might need outside help. The ability to make good judgements based on what you see helps you say, 'This is something I can deal with' or 'This is something I need help with.'"

millennia, people accumulated all kinds of tricks like that which allowed them to live probably in comfort in most cases up here. And if not comfort, certainly enough to get by and survive.

### Were there shelter innovations?

After about 4,000 years ago, the winter house floor was dug a few feet under the ground with a superstructure built over it. And then either earth or sod would cover that. The entrance was a tunnel that would dip down even lower than the house floor, making an air trap. It was a clever way to keep the warm air in the house—it didn't escape every time the door was opened.

### What's the benefit of being a little bit dug in?

The insulated value of the ground itself. If the air temp is 50 below, the ground temp—even in a permafrost-rich place—is never that cold.

### How did they fill up the table?

Hunting equipment would have been very important, so there's a whole range of sophisticated technologies with different weapon heads for different prey and different means of propelling those weapons. During the earliest phase of human habitation, people would have used spears that were thrust or thrown—a pretty simple weapon that's been around for almost as long as there's been people. Another innovation that the earliest people in Alaska had was darts. The spear also propelled the use of a short stick called an atlatl, which extended the length of your hand—there's a hook on the

end that fastens into the non-pointy end of the spear, allowing you to throw with greater force and distance. Following that, the big innovation would have been the bow and arrow—that was a more precise tool. Rapid fire. As soon as it appeared on the scene about 4,000 years ago, it seems to have been widely adopted and used ever after. It probably opened up new opportunities for the same species people had always hunted, like caribou. You can more effectively target a sole animal wandering around in open terrain with a bow and



Rasic with an ancient chert projectile point in Yukon Flats, Alaska, in 2009.

arrow because it's got a lot of accuracy and you can fire it from a concealed location.

### So the bow and arrow became the king of weapons?

The one exception is that atlatl use continued in coastal areas because it's a great tool to use from a kayak. So right up until, say, 150 years ago, people were still using atlatls for seal and bird hunting from

kayaks. The advantage is the atlatl is a distance weapon you can use with one hand—you're stabilizing yourself and holding your paddle with one hand and using your dart with the other. You can't effectively hunt with a bow and arrow from a kayak.

### Are any of these weapons or tools still in use today?

Coastal areas of Alaska still use harpoons for seal hunting. Once they've been shot there's the problem of retrieving seals from the water, so harpoons are used for that. Another case is whaling. They use harpoons to spear whales, and that's a design more than 1,000 years old. It's all modified with new materials, though. Synthetic materials sort of stitched together with old materials. There's still wood and ivory, but there's also metal and wire and synthetic materials too.

### Were all ancient tools weapons?

Skin-sewing was one of the most critical technologies that people had. We find tiny needles made of ivory or bone. Keeping yourself dry and warm would have been really important and good sewing technique was essential to that.

### Were dogs companions?

### Hunters? Means of locomotion?

All of the above and then some that we wouldn't necessarily think about, like food. People ate dogs, probably. My guess is dogs were probably in this part of the Arctic 14,000 years ago right along with the first people. Dogs would have been one of the basic tools that people brought with them when they came across the land bridge.



## SABRE-CUT SAW

**Recommender** Dina Bennett

**Survival experience** co-founder of Mountain Shepherd

**Why** One tool I never leave home without is the UST sabre-cut saw. One is in my pack and another in my car. The two-handed, lightweight design is easy to use, doesn't take a lot of strength and it's durable enough to cut through the thickest of wood. Last January, I was heading back to Mountain Shepherd from Roanoke as wet heavy snow began falling. At five miles from nowhere, with no cell signal, another lone traveler and I found ourselves blocked by a fallen tree. My sabre-cut saw and five minutes of cutting prevented a long, cold walk to rescue.

**Safety tip** Watch out for falling dead limbs when cutting down trees.



# OL KIT

Mountain Shepherd Wilderness Survival School instructors pick the implements you need to endure in the wild.



## BULO MACHETE

**Recommender** Jeff Reagan

**Survival experience** former SERE instructor

**Why** I've spent a lot of time in jungles and the bolo made easy work of chopping grass or bamboo. But the jungle isn't the only place it's useful. It's always on my hip.

**Safety tip** The curved blade is designed for maximum impact—let the tool do the work and don't overextend your swing. When buying, blade should not flex.

## OTHER TOOLS



### SHOVEL

During SERE training, soldiers carry an entrenching tool, says Reggie Bennett. A small, folding shovel makes digging for groundwater (or latrines) a lot easier. A lot of them have a pick on the opposite side as a bonus feature. Admittedly, shovels are a lot more feasible in a stationary off-the-grid situation rather than in a backpack because of the added weight. Alternate digging options in lieu of a shovel: fixed blade knife, stick (if the ground is soft enough), piece of shale.



### SHARP PIECE OF ROCK

"You always have to keep your survival eyes out," says Bennett. "It's all about improvisation." He suggests "tapping into your inner kid" to find uses for everything from sticks to found pieces of metal, glass or plastic. "Shale rock and quartz are great things that you can dig or pry with. When we're doing shelter crafts, rocks are our hammers. That's how we beat the stakes into the ground. You can also use a rock to beat wood to shatter it for firewood."



### RIFLE

"If you're heading into the wild, that's when you start thinking about rifles and things like that, so that you can shoot animals for food, for sustenance," says Bennett. "You really have to practice with those weapons. But if you're going into Alaska, there's a lot of places you can't enter unless you have a rifle because of polar bears, since they're so dangerous. 30-06 is a good caliber for all-around."



# ANCIENT WAYS and Means

**Jeff Rasic, archaeologist with the National Park Service, talks the tools and weapons that have stood the test of time in the Arctic.**

**Tell us about the environment of ancient peoples in the Arctic.**

People have lived in Alaska for 14,000 years, and the environment has changed a lot. But what hasn't changed is that Alaska is at a high latitude, so it has always been a cold place with a long, dark winter and great seasonal variation. In interior Alaska, around Fairbanks where I live, it can be over 80 degrees in the summer and we have 24 hours of sunlight, but in the middle of winter we just have a few hours of sunlight and temperatures

are routinely 20 to 30 degrees below, occasionally spiking down to 50 or more below.

**What would have attracted people to that environment?**

Rarely did people think in terms of "I don't like this and I'm going to migrate to another climate." They were born into a certain environment and that's what they took as normal. There's also great seasonal abundance. We have herds of caribou that number in the hundreds of thousands at certain times of the year. It can be the best living in

the world for a hunter-gatherer if you're in the right place at the right time. I can imagine being parked at a stream mouth with hundreds of thousands of migrating salmon choking the stream and thinking, "Why would you ever leave this place?"

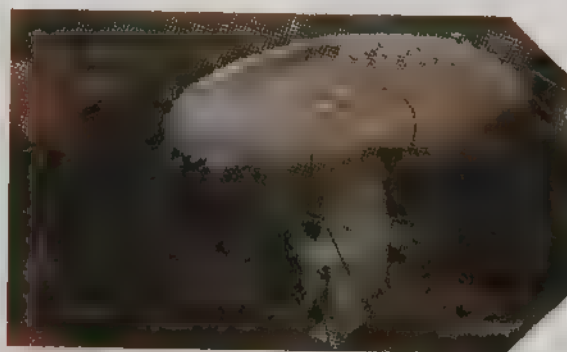
**How did the ancient Alaskan natives shelter in extremes?**

If you take two caribou hides and you do two layers on your tent with the hair pointing inward, you create this nice natural air pocket with good insulation value. Over the



### ROUGH-SKINNED NEWT

Travelers in the Pacific Northwest may see these lizards as a meal. "Stay away from them," says Dr. Mark Siddall, curator of the "The Power of Poison" exhibition at the American Museum of Natural History. "They're loaded with tetrodotoxin, which is also found in pufferfish." The toxin paralyzes the body, including the diaphragm. The heart and brain remain unaffected, allowing victims to regret their snack as they



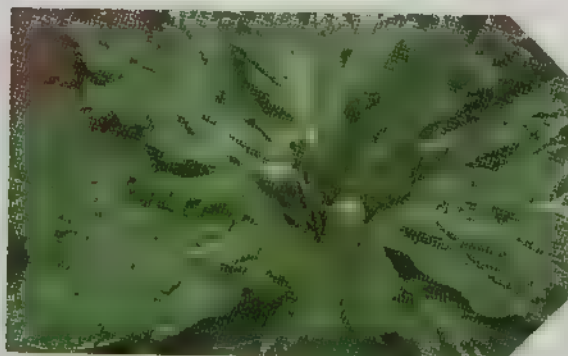
### PANTHER AMANITA

The more poisonous but less iconic cousin to the fly agaric, this mushroom packs a deadly punch to anyone foolish enough to take a bite of its off-white flesh. "It looks innocuous, but it can kill you," says Turner. As soon as 30 minutes after ingestion, victims feel a sense of dizziness that soon progresses to full on delusions and ends with a deep sleep, says Turner.



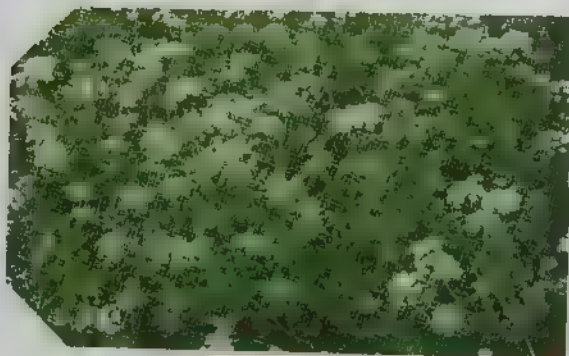
### DESTROYING ANGEL

The effect of this lovely white mushroom's toxin is stomach-turning. The poison typically lays dormant for six hours to a day before announcing its presence via bouts of explosive vomiting and diarrhea, which can last up to nine hours. "Then you recover," says Turner. "Except you don't. The toxins are impacting your kidney and liver." These organs eventually shut down, killing the victim within a week.



### MANDRAKE

Belonging to the same genus of plants as the common tomato and potato, mandrake leaves and fruit contain a deadly toxin long ago bred out of its beloved cousins, according to Turner. "The problem is that they all have parts that look good to eat," she adds. Ingesting mandrake and its alkaloid poison can cause nausea and gastrointestinal distress, progressing to hallucinations and asphyxiation.



### WATER HEMLOCK

Although poison hemlock is more notorious—Socrates was forced to drink a tea made from it as execution—water hemlock is just as deadly. The real danger lies in the plant's roots, which resemble carrots. "Getting a little bit of the juice in your eyes or your mouth would make you sick," says Turner. Vomiting and diarrhea ensue, then nervous system shutdown, resulting in seizures, coma and death.



### BLISTER BEETLES

When food runs scarce, survivalists often seek sustenance in nearby insects, but the wise gourmet stays away from these brightly-colored beetles. "It's a terrible idea to eat these insects," Siddall says. A compound in blister beetles called cantharidin would not only raise painful sores in the inside of your mouth, but can cause massive bleeding from your kidneys when ingested, says Siddall.

7,000 of Alaska's estimated 175,000 moose are harvested each year, according to the Alaska Department of Fish and Game. Only one is allowed per human hunter.



# NG & TRAPPING

**River Monsters** Jeremy Wade and the **SAS Survival Handbook** grabbing dinner in the great outdoors.

## ON LAND

### READING THE TRAILS

According to the *SAS Survival Handbook*, most animals are creatures of habit and follow the same trails to their regular watering or feeding spots. If prints are clear and well-defined, no water has seeped in or accumulated from rain and the prints seem proportionally small enough to belong to game, then you've got a lead.

### WIDE TRAILS

While setting up your traps, try to cover as wide an area of the game trail as possible, making it more likely that you'll make a catch. Check each of your traps at first and last light, making the necessary repairs as you go. Even if you're on the move, setting up some simple traps when stopping to rest can produce rewards. If you have a bit of extra food you're willing to use for the purpose, try baiting your traps for more immediate results.

### A FEW SIMPLE TRAPS

The *SAS Handbook* classifies traps in four categories: Strangle, Denial, Mangle and Tangle. Here's how a few of the simplest traps work:

The *SAS Handbook* recommends setting a snare for small animals like rabbits a hand's length from a rock or other obstruction that the animal will have to negotiate. The snare itself can be made by tying wire, rope or twine to a sapling with a loop at the end. Game caught on a springy snare branch get dangled, too.

Trapping medium-sized game—like pigs, foxes and badgers—can be achieved with the blunt force of a deadfall, which is created by lashing small logs together and using a forked stick to hold up their weight. When game disturbs the stick, the weight of the tumbling logs kills it. Larger deadfalls may even dispatch a bear.

The *SAS Handbook* recommends the use of "noose sticks" as traps for birds. By tying several individual snares at regular intervals along a stick and placing the stick in a favorite roosting place, you can increase your chances of multiple catches. Also effective: baiting pieces of fruit with fish hooks, which get caught in birds' throats.

### WINK OUT AID THE DAY



# Tempting POISONS

Mother Nature has a way of arming some very inviting animals and plants with toxic defense systems.

**T**HE NATURAL world often presents a brutal struggle for survival, and plants and animals have been slugging it out for eons. As a defense mechanism, some of them—often the ones that seem perfectly harmless and delicious-looking—have perfected the art of being exceptionally poisonous. Nancy Turner, ethnobotanist and co-author of *The North American Guide to Common Poisonous Plants and Mushrooms*, and other poison experts point out a few of these artfully-cloaked would-be killers to help you discern the difference between a good meal and a bad death.




## BANEBERRY

The bright red hue of the baneberry should warn the experienced survivalist of its toxic nature, but to the untrained (and hungry) eye, the baneberry looks like an easy-to-spot tasty treat. "The berries are very showy," says Turner. Scarfing down as few as six baneberries can cause crippling stomach cramps, dizziness, increased pulse and general circulatory collapse.



## LABURNUM

The golden hue of this plant catches the eye, and the inexperienced may be fooled into thinking these sweet pea-esque pods would make a good snack. "The pea family has a lot of plants that are edible, but also a lot of plants that are very toxic," says Turner. These seeds, packed with toxic cytosine, cause the mouth to burn and eventually paralyze the entire body—including the respiratory system.

A photograph showing a vast landscape covered in a thick layer of pink locusts. The locusts are also seen flying in the sky, creating a dense, dark cloud against a lighter background. The scene is captured from a low angle, emphasizing the sheer number and movement of the insects.

A swarm of pink locusts, estimated to be 100 million strong, arrive from western Africa on the Spanish Canary Island of Fuerteventura on November 29, 2004. They destroyed one third of the African countries' crops.

# Makealife FISHI

Sometimes you don't have access to ammo, bows, rods and reels. lead you through alternate ways of

By putting several lengths of different strength line on winders to avoid tangling, an emergency fishing kit can fit in your pocket. "The great thing is, a tiny little tin will hold some very useful basics," explains Wade. "There's room for some light line, some small hooks, maybe some little split shots—they just make getting the bait out into the water and sitting on the bottom a little bit easier. You could maybe fit some pieces of cork that you can use as a float. I think some heavier line, as well. Maybe some 20-pound string and some small lures because, if you have the opportunity to catch something bigger, you won't want to pass it up."

The ideal is you go out, you catch a fish and you do that every day, but the reality is that you might catch more than you need in one day," says Wade. "You can gorge yourself on that, but what would make more sense would be to either smoke them or cut them into thin strips and put them out in the sun on a platform made out of twigs. If the smoked or dried fish don't get damp, they will actually keep for quite a while."

According to Wade, it's folly to assume that the legendary short memory of the pet goldfish extends to the wild. "Fish become very educated when they are pressured," explains Wade. "So were you to go to a place where people fish using all the modern gear, catching with simple gear in that pressure situation would be quite difficult." Better to seek out spots that are, as yet, untested. "The more basic techniques work better where the fish are a bit naive," adds Wade.

If you can't find anything to work as a line and a hook, sometimes you can catch fish with your hands. It was in Zambia, where you get these dried-up streams, and, if it rains suddenly, they've got water in them, and at certain times of the year, fish will run up those streams and get trapped in the shallow water," says Wade. "You can also fashion a minnow trap using a water or Coke bottle cut in half with the spout end upside-down inside the bottom half. Small fish are trapped inside by the current, which prevents them from using the tiny opening as an escape route."



maybe 100. They can remain in the air for very long periods of time if needed. They have been found transmitted from Africa to Jamaica and so on. We're talking huge distances they can potentially move.

#### **What causes a swarm?**

In the case of locusts, what we discovered is that these swarms are actually driven by cannibalism. Every individual is trying to eat the one ahead of it—and trying to prevent themselves from being eaten from behind. And so what looks like cooperative behavior is actually a selfish herd. When they run out of the essential nutrients protein and salt, they end up turning on each other, because the other insects are perfectly packaged sources of nutrients. There's nothing better for you than eating someone else.

#### **So, do they eat all the vegetation in their path?**

One thing we have never been able to understand is why insects like this will pass through some areas and not touch the vegetation. We think it is that they're not particularly short of carbohydrates, which is what you typically think of an insect requiring. What they tend to be rather short on are proteins and salts, which are essential to their survival, but are very, very hard to find in certain landscapes. If they're not available, the locusts will start becoming cannibalistic, and that drives the swarm. And that's good, because it gets them out of these nutrient-poor areas.

#### **Say you're a subsistence farmer, is there any way to protect**

#### **your crop from an encroaching locust swarm?**

The Food and Agriculture Organization of the U.N. estimates that desert locusts alone affect the livelihood of 1 in 10 people across the planet



Cousin post-swarm in Mauritania, 2004.

by food shortage. Desert locusts can invade up to one-sixth of the Earth's land surface during plague years. It's difficult to know where they will swarm, so warning can be quite difficult. And then, what can you do? The locusts also tend to follow the trade winds over successive years so we're talking about multiple generations of insects. They hatch, they march, they fly, they follow the trade winds, they mate, they lay eggs, and then, weeks later, those eggs hatch and you have a new swarm.

#### **Can the swarms themselves be a food source?**

Locusts are actually pretty delicious. They're fatty; they're tasty, chunky insects. But the problem is, when they become the swarming form, they evolve—they can't hide from predators anymore, there's too many of them. So they become brightly-colored; they have

red eyes and yellow and black patterning on their bodies. Just like on wasps and bees, those colors are an indication to predators that they're toxic. What the locusts do is start eating toxic plants and sequestering the toxins. If you handle them, the toxin secretes onto your fingers. My hands became very swollen and cracked when I touched one, to the point where I had to wrap them up in bandages (left). A colleague of mine tried to eat one, and there's a photo of him with his glands like golf balls. So, unfortunately for humans, they're not particularly palatable at that stage in their life.

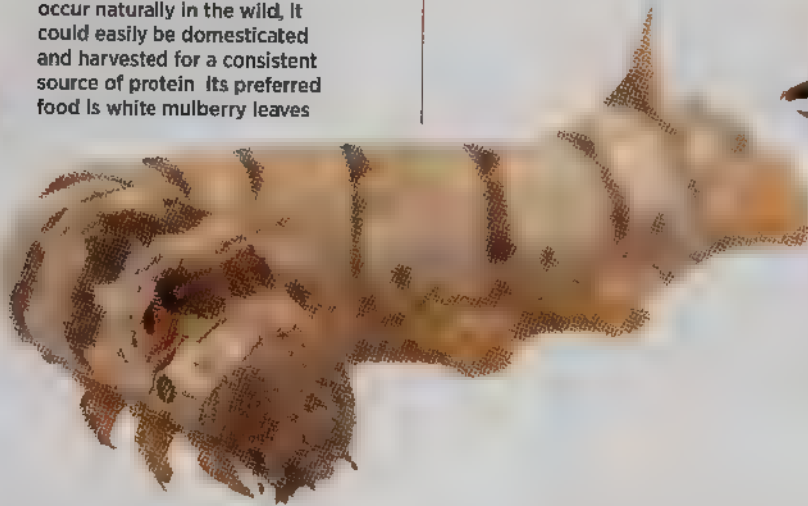
#### **If you are living off the land, and in the middle of the swarm, what can you do to survive?**

The swarms themselves are not dangerous. The locusts have no interest in you. But the danger is if you're living on a tightrope where your farmland is the livelihood of your family, then the swarm comes at the wrong time and eats through your crops—and they can eat a vast amount, multiple times their own body weight every day. If there's sufficient protein and salt, they will sit in an area and eat their way through it. In terms of eating insects, this is a potentially huge way of humans obtaining protein. Like those swarms of flies over the lakes in Africa that have become a very important part of the local diet. They look like huge plumes of smoke, but in fact it's mating swarms of flies. Locusts themselves, if you can provide them a non-toxic plant to eat for a while to clean out their guts, they would become non-toxic again.



#### SILKWORM (CATERPILLAR)

Though *Bombyx mori* doesn't occur naturally in the wild, it could easily be domesticated and harvested for a consistent source of protein. Its preferred food is white mulberry leaves.



#### TERMITES (ADULT)

2,300 species of termite exist worldwide. They prefer moisture and darkness, so look in dead logs and stumps, which can contain hundreds at once. Some tropical species raise giant mounds consisting of termite feces, soil, and fungi, which can house millions of the lumber-loving pests.

# for Eating

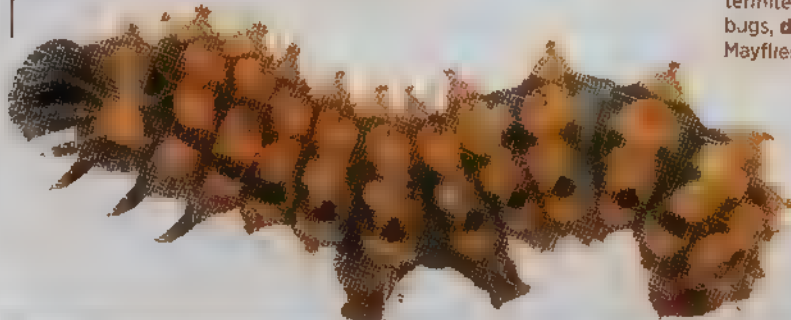
A bug-by-bug breakdown of which pack the most protein punch.



#### BEST SOURCES FOR ESSENTIAL FATTY ACIDS

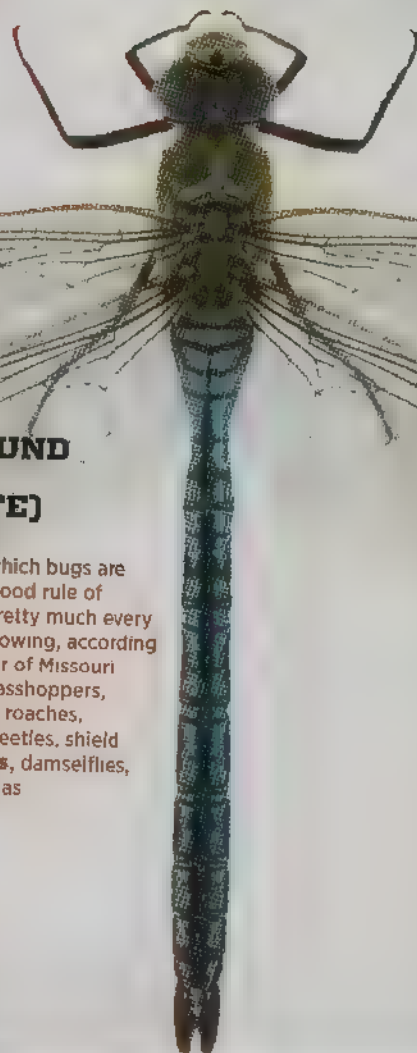
Essential fatty acids—which are a vital component of cell membranes and help regulate blood pressure, among other essential body functions—can't be synthesized by the human body, which means you have to get them from what you eat.

- African palm weevil (*Rhynchophorus phoenicis*)
- Grasshoppers
- Variegated grasshopper (*Zonocerus variegatus*)
- Termites
- Saturniid caterpillar (*Imbrasia* sp.)



#### ALL-AROUND SOLID (AND SAFE) CHOICES

If you're unsure which bugs are stomach-safe, a good rule of thumb includes pretty much every species of the following, according to Paul Landkamer of Missouri Entomophagy: grasshoppers, katydids, crickets, roaches, termites, scarab beetles, shield bugs, **dragonflies**, damselflies, Mayflies and cicadas.





# THE SWARM

**Desert locusts have the capacity to invade up to one-sixth of Earth's land. Researcher Iain Couzin warns of the chaos of the insect going collectively cannibal.**

**Do you find there's still a Biblical connection to swarms?**

That was all over the news recently because a swarm of locusts moved from Egypt into Israel. There's so much Biblical history, and, back then, it was believed that God sent the locusts to the Red Sea. Today, I think most people are aware that these insects can overtake the land all on their own.

**How does a locust swarm form?**

Locusts normally can't stand being near each other. They're

shy, cryptic, green grasshoppers. It's only when they're forced to come together because of limited resources that there's this sudden transition—within an hour—behaviorally. They will transform into this gregarious swarming form. It's like the Jekyll and Hyde of the insect world.

**How many insects might we be talking about?**

These swarms can cover hundreds of square kilometers at incredible density. These are some of the largest groups

of multicelled animals on the planet. They can number in the billions.

**How does the swarm travel?**

They don't really know where they're going—they follow the trade winds. When locusts get to the edge of a habitat, they have to wait for the winds to take off and fly. And that's how they can invade such a large area of land. Even ships at sea can sometimes be descended upon by locusts. They can move tens of kilometers per day, even

case of a POW situation, SERE training involves a week in a national forest alone—it's called a "solo."

**5.** Soldiers don't sleep with footwear on for several reasons. Feet need to be dried out overnight to maintain skin integrity and prevent cold injuries. Also, feet continue to sweat if boots are worn while sleeping, and the boots cannot dry completely. Boots can be placed inside the sleeping bag to dry out. Boots must not be placed outside in very cold temperatures because the moisture in them can freeze, and cold injuries can occur when placing feet in cold boots.

**6.** Backpack straps may decrease blood flow to the arms, hands and fingers, so drop the load every few hours to allow increased circulation.

**7.** Snow blindness results when solar radiation "sunburns" unprotected eyes. Eyes may feel painful, gritty, and there may be tearing, blurred vision and headaches. If sunglasses are not available, opaque eye covering (for example, tape-covered eyeglasses) with narrow horizontal slits provide adequate field-expedient eye protection.

**8.** Soldiers participating in cold-weather operations eat snacks before bed at night. This helps keep soldiers warmer while they catch a few winks, which prevents shivering and allows sounder, more restful sleep.

**9.** In some arctic areas, there may be little or no fuel supply with which to melt ice and snow for water. In this case, body heat can be used to do the job. The ice or snow can be placed in a waterproof container like a water bag and placed between clothing layers next to the body. Don't place directly next to the skin as it will cause chilling and lower the body temperature.

**10.** Mosquitoes don't often bite through two layers of cloth. A lightweight undershirt and long underwear will help. To protect ankles, blouse the bottoms of trousers around boots.

**11.** Grass is a good insulator and will collect moisture from the feet. To prepare grass for use as inner soles, grasp a sheaf of tall grass, about one-half inch in diameter, with both hands. Rotate the hands in opposite directions. The grass will break up or fluff into a soft mass. Form this fluff into oblong shapes and spread it evenly throughout the shoes. The inner soles should be about an inch thick. Remove these inner soles at night and make new ones the following day.

**12.** Cloth can be used to improvise "Russian socks." The material should be cut into strips approximately two feet long and four inches wide, and then wrapped bandage fashion around the feet and ankles.

**13.** In dry climates, clothing is needed for protection against

sunburn, heat, sand and insects. In some deserts, there can be a temperature difference of more than 60 degrees between day and night, so don't discard any clothing. Keep your head and body covered, and blouse the legs of pants over the tops of footwear during the day. You should not roll up sleeves, but keep them rolled down and loose at the cuff to stay cool.

**14.** Your watch can be a compass. In the northern hemisphere, point the hour hand of the watch at the sun. Divide the angle between the hour hand and 12 o'clock in half. Run a line through the angle. This creates your north and south line. The smallest angle will point south. You will now be facing south.

**15.** Everybody's afraid of something—wild animals, the dark, suffering and death, being alone. Everybody's more susceptible to some things—exhaustion, dehydration, heat, cold. The key is recognizing the stress. We call it the "balcony effect." Your survival episode is a play, and you're a character in that play. And you're not going to realize what's going on until you can pull yourself out of the play, get onto the balcony and look down.

**16.** Our soldiers train like they fight and fight like they train. You gotta get out there. Learn the basics and then get right out in the woods and do it.

## SURVIVAL

### AX

**Recommender** Mike McCoy  
**Survival experience** former Air Force SERE (Survival, Evasion, Resistance and Escape) instructor

**Why** We always carried an ax through SERE training. The ability to cut down trees and de-limb them for fire and shelter was crucial. Axes used properly made easy work of the job.

**Safety tip** Always use the tree as a barrier between you and the ax, so the ax can ricochet away from you. Also, check around you for items the ax can get caught on while swinging.



# Essential Tools

### MULTI-TOOL

**Recommender** Rick Arnold  
**Survival experience** former SERE instructor

**Why** You have many different tools for many jobs in a compact device. The ability to take things apart, improvise items and fix equipment make this a top tool to carry.

**Safety tip** Make sure you buy a multi-tool that locks every tool in place. This will prevent the tool from folding back on your hand.



### FOLDING KNIFE

**Recommender** Scott Smith  
**Survival experience** former SERE Instructor

**Why** The folding blade knife is the one tool that I use most often in the woods. It's compact and light, and it's easier to use for people who do not work with larger tools regularly. A smaller blade makes improvising intricate items a breeze.

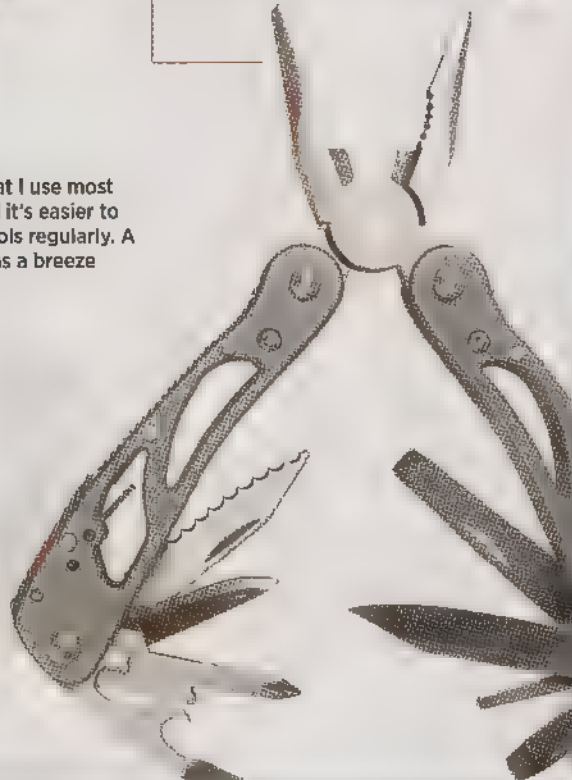
**Safety tip** Always fold shut before passing.

### FIXED-BLADE KNIFE

**Recommender** Reggie Bennett  
**Survival experience** co-founder of Mountain Shepherd, former SERE instructor

**Why** I never enter the wilderness without a fixed-blade knife. It can do everything a folding blade can do and more—like splitting wood, digging and prying.

**Safety tip** Always cut away from your body.



**WHETHER IT'S FOR SEVERAL DAYS OR THE REST OF  
YOUR LIFE, HERE'S HOW TO THRIVE ON YOUR OWN.**



About 100 lightning bolts strike  
Earth's surface every second.  
And each can pack up to 1 billion  
volts—adequate to heat the air  
around the strike to five times  
hotter than the surface of the sun.



#### **HEADLINE**

An Army Ranger instructor drills a company on repelling from a 50-foot rock during the Mountain Phase of Ranger training in Dahonega, Georgia.

# **16 Lifesaving SPECIAL OPS TIPS**

**Former Air Force SERE (Survival, Evasion, Resistance and Escape) instructor Reggie Bennett arms you with military training tips to take on any terrain.**

**1.** Ever wonder why the military does so much PT (physical training)? If you are out of shape in a survival situation, your ability to think clearly and combat fatigue and the elements are lowered. Any PT is good PT, whether it be running, situps, pullups. Try to do a variety.

**2.** Give yourself an edge by hiking across all kinds of terrain in every weather condition. Subjecting yourself to wind, rain, snow, heat, cold and changing terrain and altitude will make it so that traveling in them will become familiar to you.

**3.** If you are uncomfortable in the dark, practice hiking in low light and at night, and periodically stop and turn off your light.

**4.** Train yourself out of a fear of being alone. To teach soldiers how to combat isolation in



OFF THE GRID

# SURVIVAL



# Newsweek


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"After the middle of April, it's twilight all night. But then we're directly underneath the aurora borealis," says Alaskan Jack Reakoff. "We have other light sources here that most people don't think about."

## What's the most frightening situation you've been in?

One year, it got really cold during moose hunting season, and the river froze early, so we didn't get a moose like usual. And we have to get a moose to make it through the winter. Come December, I was hunting with the dogs in the dark of winter. I ended up shooting a moose about four miles from home, but, in the process, I lost my dog team. They had everything in the sled: They had my snowshoes, they had my ax, they had my thermos of hot tea. The trail was soft, and I went about four miles and I realized that if I kept going, not only would I not make it back to butcher the moose—and I have to butcher the moose because it's going to spoil—but I also wouldn't have been able to make it the eight miles back home. So I decided to turn around. By the time I got back to the moose, I was pretty whupped. I remembered a native elder told me once that if you ever get into a situation like that, to drink blood. I was so thirsty and so cold. I only had the pair of gloves I had on, and you can't use those to butcher the moose because they're going to get full of blood and wet. So it's all done bare handed. You start butchering the hide down, and you put your hands on the warm meat underneath until eventually you can cut a hole in the flank and put your hand into the entrails.

Then I just remember skinning out the femoral artery so I could cut it and suck on it like a straw. Drinking that warm blood reenergized me to finish the chore at hand. But when I finished, it was dark and 25 below, and I still had to go the four miles back on a soft trail.

I was doing OK then about a mile from home the trail goes

because we hadn't had meat for so long. I was crawling near the cabin and the two dogs left at home barked. I stood up against a tree. My wife Lori opened the door and jumped back, on her face was utter shock. From drinking the blood and butchering the moose, I was covered head to toe with blood, and it

**"I pulled out that half a heart and put it in her hand.... She knew I lost the dogs, I got a moose, I barely made it back."**

into a spruce forest, and there was a 100-year-old spruce. It had giant boughs, so there was no snow under the base, and it just looked so inviting. I crawled in and got into a fetal position. I was shivering uncontrollably; I couldn't warm myself up with physical exertion anymore. I was laying there starting to fall asleep. But I realized that I wasn't falling asleep, I was dying. I started thinking of my family and I forced myself to get back up. I ended up crawling the last mile back home.

I had taken half of a loin and half of the moose heart and put them in my parka pocket

was frozen on me by then. I reached into the parka pocket and pulled out that half a heart and put it in her hand. The whole story was told to her in that moment: She knew I lost the dogs, I got a moose, I barely made it back. I fell asleep while she was frying the meat. The next day I took my daughter's rig and snowshoed up. The dogs were only half a mile from where I'd turned around. They'd gotten stuck in overflow, but luckily had pulled the toboggan out. Over the next couple of days we carried the rest of the moose meat back home.

# Eating in EXTREMES

**Jack Reakoff, subsistence advisory committee member for the Alaska Department of Fish and Game, sounds off on feeding oneself in Alaska.**

## Why Alaska?

I live in Alaska because I was born in Alaska. I live in Wiseman, 275 road miles north of Fairbanks.

## What are the realities of eating in Alaska?

[Reality shows] say idiotic things all the time. They say Alaska is teeming with wildlife. That it's the Serengeti. Well, it's not. This is high-latitude country and the density of moose here is .1 to .2 moose per square mile. Basically, it takes 10 square miles to make one moose. You gotta look at a lot of country to find one moose. In the fall, we spend about two weeks looking for them.

## Talk me through the steps

**of how that works**

You can't use ATV's where I live. You have to carry the moose off the road. A quarter mile is a long way to transport 800 to 900 pounds of moose meat. You tie each piece on a backpack. And you do this in a timely manner because we have grizzlies that we live among—a healthy bear population—so you can't just leave your moose lying around.



## Is it a perilous hunt?

Moose are not a formidable animal to humans. Occasionally bears can be aggressive; a minority of bears have an aggressive tendency. But it's like walking down a city street, you never know who out there is actually that sociopath. Especially on a dark night in New York City.

## How much moose is enough when it comes to eating?

We're only allowed one moose a year. It's 80 percent of our annual diet, because you're getting that 800 or 900 pounds. Anthropologists have come in and analyzed what people in Wiseman are actually

eating. Bell sheep and caribou were 10 or 12 percent, a very small percentage is fish and the rest would be birds: ducks, geese, grouse, ptarmigan. If you don't get a moose, you have to put a lot of energy into traveling farther, and hopefully get a caribou, which are migratory and range hundreds of miles. They're unpredictable. We can count on moose. They live here.


## Are there vegetable sides?

This is the northernmost limit of gardening. This last year I harvested 120 pounds of potatoes, 60 pounds of carrots, various cabbages and turnips. The ground is cold but not frozen. We're not permafrost. My root cellar is 44 degrees F—which is perfect refrigeration. We don't have a refrigerator, but we have cold ground.

## Is it tough?

I don't want to be portrayed as on the verge of starvation. Anybody that's on the verge of starvation in rural Alaska is either inept or new to the country. One of the two.





A flat-hulled jon boat skims a swamp, likely teeming with midges. The non-lethal pests—too small to provide nutritional value—are most often known as biting midges but are also called “no-see-ums,” “punkies,” “five-O’s” (for biting around 5 p.m.), “pintyeen gnats” and “moose flies.”

that, not only is it going to be mega, mega concentrated, but it's going to be very dark yellow in color and will have absolutely no benefit whatsoever," says Hudson.

What is important, says McNutt, is focusing your efforts on finding clean drinking water. "Water always travels downhill, taking the path of least resistance—so should

you," he explains. "When you find a source, backtrack it upstream as far as possible. The farther water travels from a source, the longer it has to pick up contaminants." If a still water source is the only one available, Hudson recommends boiling before consumption. "You don't have to let it boil for too long," he says. "We've got a saying that goes, 'Big bubbles, no troubles.'" If a container for boiling isn't available, a rudimentary filter can be made using a sock, but Hudson points out that, without boiling, this isn't guaranteed to eliminate the harmful pathogens that can be found in murky water—or a dirty sock. "It is even possible to boil water in a plastic bottle, with a lot of practice," he adds.

When locating, boiling and filtering are no longer viable options, it's time to turn to the collection of rainwater or condensation. This can be achieved by placing a container as far away from tree cover as possible, as raindrops can pick up traces of contaminants like animal feces as they run through the leaves. As most schoolchildren could tell you, water can also be found inside certain plants like cacti, but Hudson advises against it. "Some plants will contain water, but then you have to be able to positively identify the right kinds of plants," he cautions. "I would never advocate people testing plants, because some of them will kill you in the time it takes you to do the test."

## HOW TO RIG A CONDENSATION TRAP

**With just a plastic bag, you can create a lifesaving device.**

According to survival expert John Hudson, one of the most important survival items in your arsenal could be a sturdy, clear plastic bag. "The best way I've seen of getting safe drinking water is if you can get a big, clear plastic bag and wrap it around a nonpoisonous, deciduous-type tree that's in leaf," explains Hudson. "Trees will pump out thousands and thousands of liters every day."

The first thing to remember when looking for a suitable tree is that you should find one upon which the sun is shining directly. Then, you're basically in business. "You need to tie off the end of the plastic bag so it's an almost airtight seal, and give it a slight angle downward, so the moisture doesn't run out through the end you tied around the branch," continues Hudson. "I've seen those bags gather a liter easily in a matter of hours." The water is safe to drink and the process doesn't have any negative effect on the plants themselves. Plus it can easily be repeated on the same plant within a few hours.

**Other possible potable water leads,**

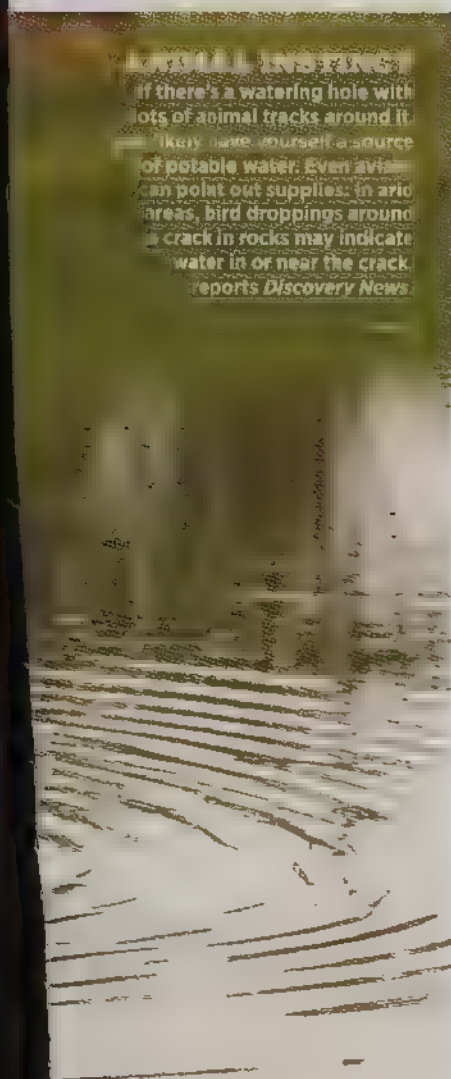
**If you find yourself without a bag:**

**Look for natural rainwater reservoirs in large indentations in rocks.** Especially ones in crevices tucked out of the sun, so they aren't prone to evaporation.

**Follow game trails.** Animals need water, too, and they may lead you to it.

**Collect dew.** You have to be fast, because it evaporates early—and also ascertain that there isn't animal feces on any leaves you might collect it from.

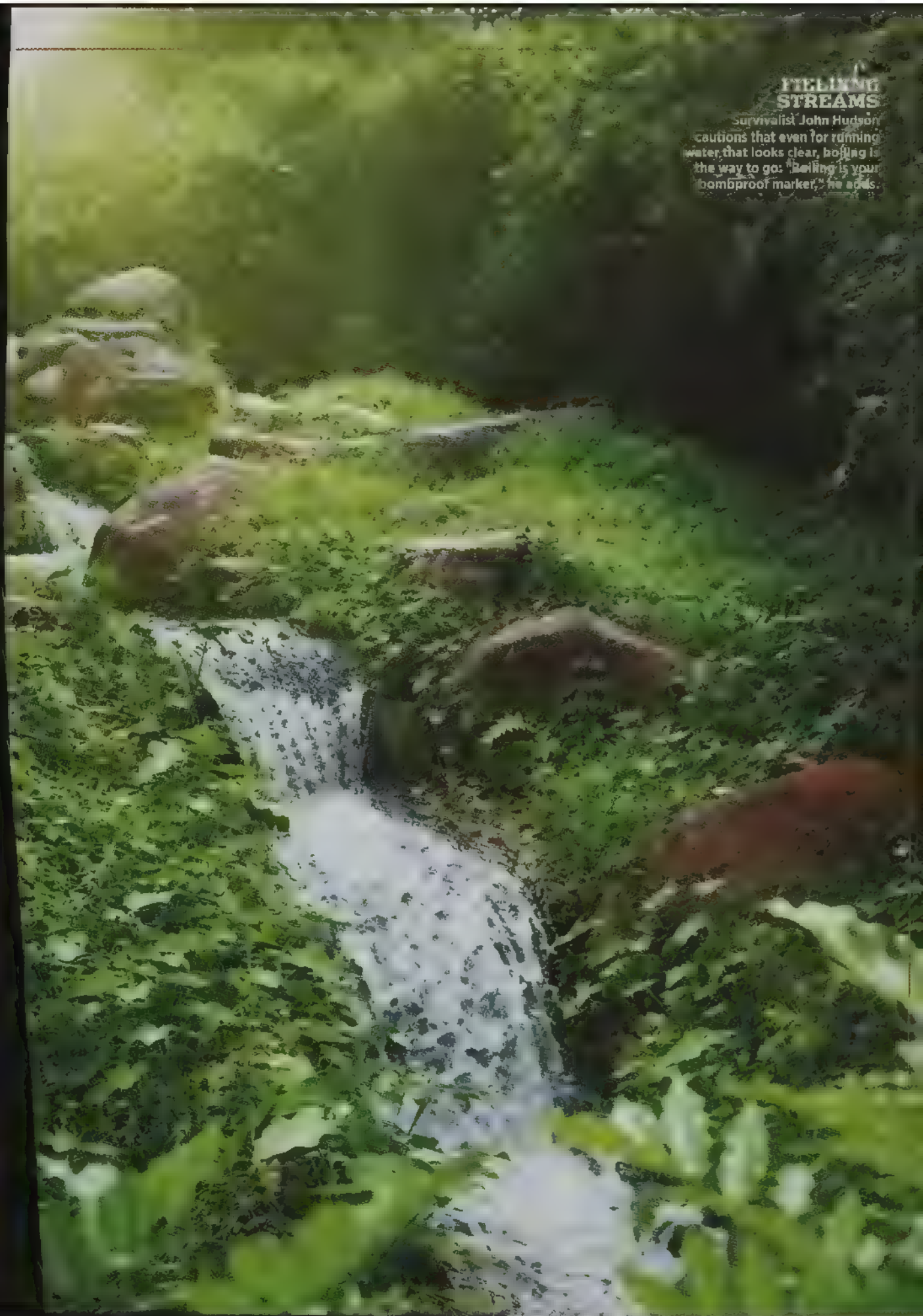
**If you see damp soil and it hasn't rained recently, dig.** Tapping into underground water sources is the way wells work.



**Look for natural rainwater reservoirs in large indentations in rocks.** Especially ones in crevices tucked out of the sun, so they aren't prone to evaporation.

## FUELING STREAMS

Survivalist John Hudson cautions that even for running water that looks clear, boiling is the way to go: "Boiling is your bombproof marker," he adds.



# NICE

KEEPING YOURSELF FED AND  
HYDRATED IN ANY SITUATION

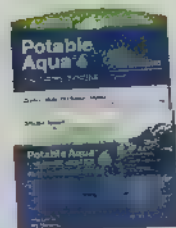
## FISH FOOD

According to the Florida  
Museum of Natural History,  
approximately 27,500  
species of fish known today.  
Most of them are edible. A few,  
like pufferfish, are toxic. A few  
others that are safe to eat, like  
catfish, have protective spines  
and spikes, so handle with care.

# BAG?

## WATER AND FOOD

I'm a proponent of packing three liters of drinking water in your bug-out bag. At least one of those liters should be in a metal container so you have the option to boil water in that container to purify it if you do end up having to find H<sub>2</sub>O along the way. You should also have some water purification tablets that you can tuck into a pocket; they can purify one liter per tab. As far as food, we are used to eating however much we want whenever we want, and people feel the effects of not eating within hours even though they can actually survive for three weeks without food. I'm a huge fan of packing open-and-eat meals that require zero preparation. And high-calorie energy bars like Clif Bars and PowerBars are outstanding bug-out meals.



## MEDICAL

You'll see a lot of minor wound things in most survival kits, like Band-Aids, topical ointments, aspirin and things like that. But those really are just fillers and, quite frankly, aren't all that helpful in a real emergency. Survival emergencies come down to just a few categories, one of which is major blood loss. You want some kind of clotting agent and thick gauze padding. The military uses Combat Application Tourniquets (CATs) which are available for civilian use (top, \$28.99 at [Amazon.com](http://Amazon.com)). Another major category is allergic reactions. Oftentimes, people forget things like medication or EpiPens for allergies when it comes to disaster preparedness, but they could make the difference between life and death. Even Benadryl can make a big difference in an emergency when no medical attention is available.



## PROTECTION

This is a category that definitely needs to be considered. Unfortunately, there are people in this world who look at bug-out situations as an opportunity rather than what it is, which is a horrible scenario. I'm a huge fan of pepper spray, like the Tornado Pepper Spray Systems (from \$29.99 at [Gettornado.com](http://Gettornado.com)). It's really effective, it's inexpensive, it's easy to use and doesn't require any training or licenses or permits. Obviously, other categories of protection are firearms and knives—but it's really important to mention that anything you're using to defend yourself can be taken and used against you. So unless you're incredibly proficient, these might be more danger than help.





#### THYME

Like rosemary, it's a decongestant when boiled in water, but is mostly known as a digestive aid that works by relaxing the smooth muscles in the colon

#### CLOVE CAPSULES

A known combatant of ingested e. coli, clove capsules are an effective antidote for food poisoning. Take one at onset and another if symptoms continue.



#### ROSEMARY

Fresh or dried, the herb acts as a decongestant when boiled in water, with the ability to break up phlegm. It's also thought to improve memory.



# MEDICINE



#### DILL

Nicholas Culpeper, a 17th century herbalist, called this digestive aid and anti-gas agent "a gallant expeller of wind."



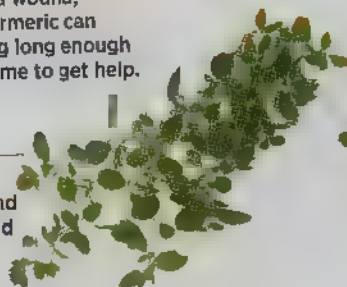
#### CHAMBERLAIN'S FRENCH-STYLE GREEN BEANS

For a burn, douse it with cold water, apply the green beans, then pour the liquid from the can over the burned area. Hold for 15 minutes in a towel and repeat.



#### TURMERIC

Like cayenne pepper but without the heat, when packed into a wound, powdered turmeric can stop bleeding long enough to buy you time to get help.




#### OREGANO

Like garlic and its fellow herbs sage and basil, oregano should be eaten liberally to reap its antibiotic, antifungal and anti-parasitic properties.

#### CLOVES

Fresh clove can preserve pork. After dinner, clove oil keeps the dentists away, helping prevent halitosis, tooth decay, cavities and toothache.





In cold environments a tent should be large enough that the head and feet don't touch the sides, climber Ed Viesturs told *National Geographic News*. A too-small tent means your feet will chill pressed against the surface, which a dream-induced kick could rupture.

## Donkeys

An extreme dislike of wild canines make donkeys great livestock guards. Though they do most of their work with a loud, laugh-like hee-hawing, a donkey can fend off small packs of wolves or wild dogs with its hooves. A donkey situates herself between the intruder(s) and the herd and brays. If the canines don't back down, the donkey gives chase. As a last defense, it'll go into attack mode, rearing up on its hind legs and coming down on the predator with its front feet.



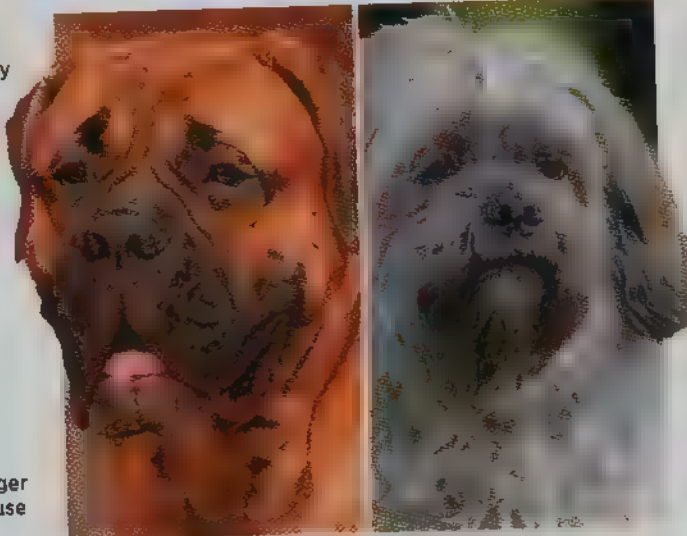
## Llamas

If you're looking to safeguard your livestock from marauding canines like wolves, coyotes and wild dogs, you can opt for a llama. They're easy to care for and eat the same feed as livestock. Their signature sound of alarm—a high-pitched squeaking akin to a turbo-powered, off-kilter porch swing—is impossible to ignore. Though aggressive, they aren't super one-on-one fighters, so a good fence helps too. To note: They aren't useful against bears, wildcats, snakes or rodents.

## Top Dogs

### Guard Dogs

Strength, courage, loyalty and resistance to pain factored into a list of great guard dog traits created by expert dog trainers, which included Staffordshire terriers, German shepherds and rottweilers. Topping the list: the **bullmastiff**. Loyal and protective, if an intruder crosses a bullmastiff's path, it gets knocked over. The **Doberman pinscher**, which came in second, is excellent for those looking to protect a larger piece of property because of its speed.

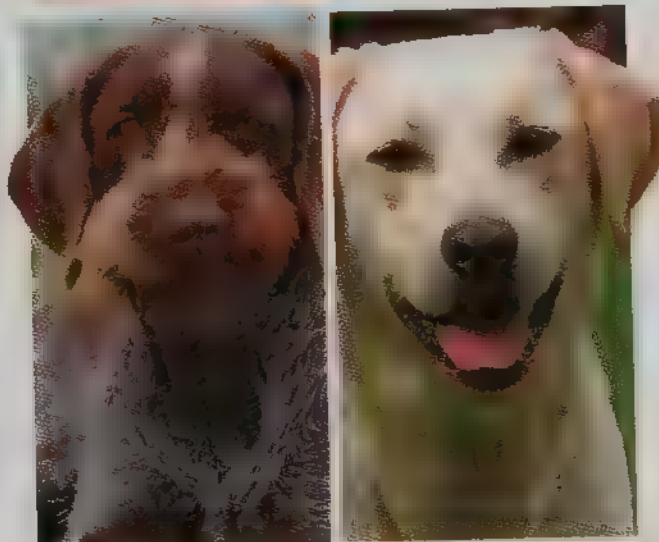


### Watch Dogs

Looking to have a canine alert system that's more bark than bite (and that eats significantly less)? Canines have a history of being good watch animals going back thousands of years. Territorial breeds are best at warning of potential intruders, including Scottish terriers, Airedales and standard poodles. Even very small and seemingly lap-centric pooches like the **Lhasa apso**, called the "bark lion sentinel dog," work great at indoor posts.

### Hunting Dogs

The **Deutsche-Drahthaar** has been noted by *Field & Stream* to have "mind-boggling tracking ability" across all species and realms: birds, rabbits, waterfowl and deer among them. (They are also great at tracking and retrieving, and some have been known for being good pointers, too.) For flushing, *Field & Stream* gives the nod to cocker spaniels, who, if they are hunting-inclined, are athletic, easy to train and eager to please.



### Retrieving Dogs

The **Labrador retriever**, according to *Field & Stream*, "has no equal" in finding and bringing back waterfowl and larger game birds. The specialist magazine threw in for good measure: "It's weatherproof, waterproof and tenacious.... Labs seem to understand there's no such thing as a free ride, and one will hunt as if it's afraid it's going to get kicked off the team. Fat chance."

like the Indian, "You are not lost; it is the teepee that is lost." It isn't serious. It cannot be so unless you do something foolish.

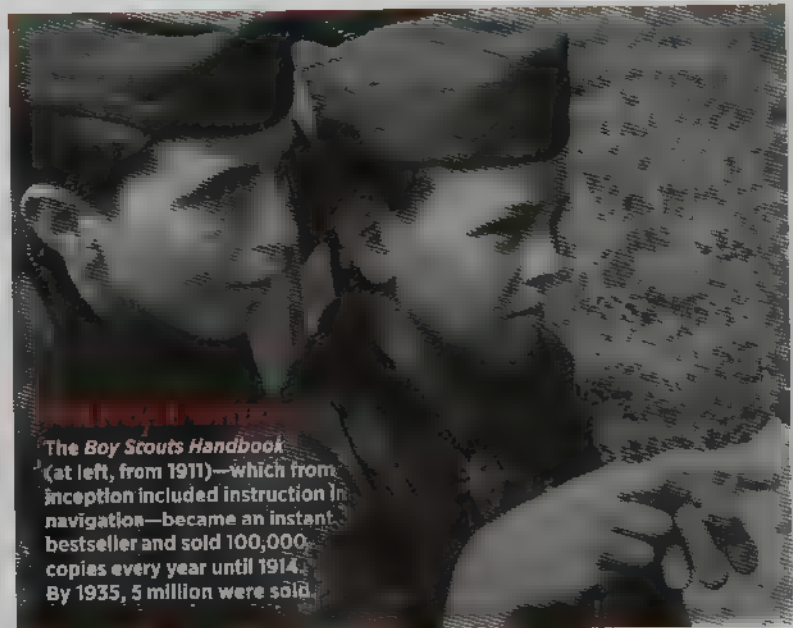
**6.** The worst thing you can do is to get frightened. The truly dangerous enemy is not the cold or the hunger so much as the fear. It is fear that robs the wanderer of his judgment and of his limb power; it is fear that turns the passing experience into a final tragedy. Keep cool and all will be well.

**7.** The simplest plan, when there is fresh snow and no wind, is to follow your own track back. No matter how far around or how crooked it may be, it will certainly bring you out safely.

**8.** All things considered, it is usually best to stay right where you are, especially if in a wild country where there is no chance of finding a farm house. Make yourself comfortable for the night by gathering plenty of good wood while it is daylight and building a wind screen on three sides, with the fire in front, and something to keep you off the ground. Do not worry, but keep up a good fire.... A good fire is the best friend of a lost man.

**9.** It is easy to make a friction fire, if you know how, and hopeless if you don't.... The surest and easiest method of making a friction fire is by use of the bow-drill. Two sticks, two tools and some tinder are needed.

**10.** When in the grinding the dust that runs out of the notch is coarse and brown, it means that the wood is too soft; when it is very fine and scanty it means that the wood is too hard.



**The Boy Scouts Handbook**  
(at left, from 1911)—which from inception included instruction in navigation—became an instant bestseller and sold 100,000 copies every year until 1914. By 1935, 5 million were sold.

**11.** There are thousands of different kinds of toadstools or mushrooms in the world, most of them are good to eat, yet all have a bad reputation because some are deadly poisonous.

**12.** Every scout ought to know the principal wild animals that are found in North America. He need not know them as a naturalist, but as a hunter, as a camper.

**13.** Observe these two rules given by an old woodsman:

(1) Never walk over anything you can walk around; (2) never step on anything you can step over.

**14.** Reach the place where you are going to spend the night in plenty of time to build your lean-to, and make your bed for the night. Select your camping spot with reference to water, wood, drainage and material for your lean-to.

**15.** If you have to choose between a bright clear stream which may be polluted at some point above and a pond full of dead leaves and peaty matter, but which you can

inspect all around and find free from contamination, choose the pond.

**16.** If you keep your head from getting hot and your feet dry there will be little danger of sickness.

**17.** If you work your hands like paddles and kick your feet, you can stay above water for some time even with your clothes on. It requires a little courage and enough strength not to lose your head.

**18.** A sudden shower is soon over. A slow rain lasts long.

**19.** To secure endurance, physical power, physical courage and skill, the first thing needful is to take stock of one's physical make-up, put the body in the best possible condition for doing its work and then keep it in good order.

**20.** Pain means something is wrong. It may be brave to bear it, but it is not wise.

*All text abridged from the Boy Scouts Handbook, The First Edition, 1911.*

# BAG?

## WATER AND FOOD

I'm a proponent of packing three liters of drinking water in your bug-out bag. At least one of those liters should be in a metal container so you have the option to boil water in that container to purify it if you do end up having to find H<sub>2</sub>O along the way. You should also have some water purification tablets that you can tuck into a pocket; they can purify one liter per tab. As far as food, we are used to eating however much we want whenever we want, and people feel the effects of not eating within hours even though they can actually survive for three weeks without food. I'm a huge fan of packing open-and-eat meals that require zero preparation. And high-calorie energy bars like Clif Bars and PowerBars are outstanding bug-out meals.



## MEDICAL

You'll see a lot of minor wound things in most survival kits, like Band-Aids, topical ointments, aspirin and things like that. But those really are just fillers and, quite frankly, aren't all that helpful in a real emergency. Survival emergencies come down to just a few categories, one of which is major blood loss. You want some kind of clotting agent and thick gauze padding. The military uses Combat Application Tourniquets (CATs) which are available for civilian use (top, \$28.99 at [Amazon.com](http://Amazon.com)). Another major category is allergic reactions. Oftentimes, people forget things like medication or EpiPens for allergies when it comes to disaster preparedness, but they could make the difference between life and death. Even Benadryl can make a big difference in an emergency when no medical attention is available.



## PROTECTION

This is a category that definitely needs to be considered. Unfortunately, there are people in this world who look at bug-out situations as an opportunity rather than what it is, which is a horrible scenario. I'm a huge fan of pepper spray, like the Tornado Pepper Spray Systems (from \$29.99 at [GetTornado.com](http://GetTornado.com)). It's really effective, it's inexpensive, it's easy to use and doesn't require any training or licenses or permits. Obviously, other categories of protection are firearms and knives—but it's really important to mention that anything you're using to defend yourself can be taken and used against you. So unless you're incredibly proficient, these might be more danger than help.





**How'd you start with methane?**

I started a biodigester in my bathroom using my baby's diaper waste. I knew there were all these organisms in that material the baby was creating. I'd take the food waste the baby didn't eat, and I'd put those in the biodigester and the organisms would eat the food waste and then fart out methane. I had this stomach I created out of plastic in the bathroom, and it farts and it also pees out this liquid fertilizer. You can burn it on a stove and you can run electric generators off of it so you can run lights, gas lamps, refrigerators—it's true natural gas. And then eventually you have a sludge that builds up that you can dry and it's soil. Three byproducts—methane, fertilizer and soil—that are fantastically useful and you don't have to worry about waste treatment.

**How does all this translate into turning on lights and ovens?**

You store the methane in a balloon or a plastic bag, and we use a hose to deliver it. In India, we used garden hoses, and, here in the U.S., we go to Home Depot and get the clear plastic hoses people use in their aquariums. If we want to create pressure, we get biogas pumps from China, which have an inlet and an outlet so you can plug a tube in one side and then it pumps it out the other. You can turn any stove into a biogas stove.

**Would this work for people who want to live off the energy grid?**

If you've got a kitchen and a toilet, you've got all the makings

of a biogas system. A family of four to six produces enough waste, both toilet and food—you can keep them separate or you can combine them—to cook for about two hours a day or run a generator for about 45 minutes a day, which you can use to charge batteries to run lights for many, many hours. And that's just on the waste they produce. Now if they went out and hunted and gathered great sources of biogas that are just piling up to rot—grass clippings, fruit fall, animal waste—they begin to get to the point where they can probably

garbage disposals are the most important technological achievement of the 21st century because you grind up the food waste and then you can turn it into soil in three to six days instead of composting it for three to six months, or you can turn it into biogas in 24 hours. And no rats, raccoons, dogs, cats or other animals have interest in it after it's been ground up. It all belongs to the microbes.

**Can you mess up the recipe?**

Yeah. It's a stomach and people tend to overfeed it and then it

## **"If you've got a kitchen and a toilet, you've got all the makings of a biogas system."**

heat water for bathing as well and generate emergency backup electricity. Could a prepper live 100 percent off-grid? Yes.

**What about places that are now covered?**

You can put a big tarp over a permafrost lake and it bubbles constantly and you capture that gas and you use it—they're starting to do that in some parts of Scandinavia. The microbes are there. It's all been a question of how much organic material is available at any given time, and, at most cold temperatures, the microbes are producing gas very slowly.

**What can we do to maximize our daily energy output?**

I've said that InSinkErator

goes sour and won't produce methane anymore and starts to produce carbon dioxide. Then you have a couple of options: 1) stop feeding it and wait until it recovers, which will take several weeks, 2) dump in sodium bicarbonate or antacid and wait for it to start again 3) drain it and refill it with more manure or lake mud to get it started again. If you have a system that has toilet waste going in all the time, or animal waste of any kind, you almost never have to do anything, but many communities don't want to do that because of psychological taboos.

**Can you store it?**

It's natural gas. It can be stored for millions of years. It'll be as good as the day you produced it.

# A Place Out Of THE SUN

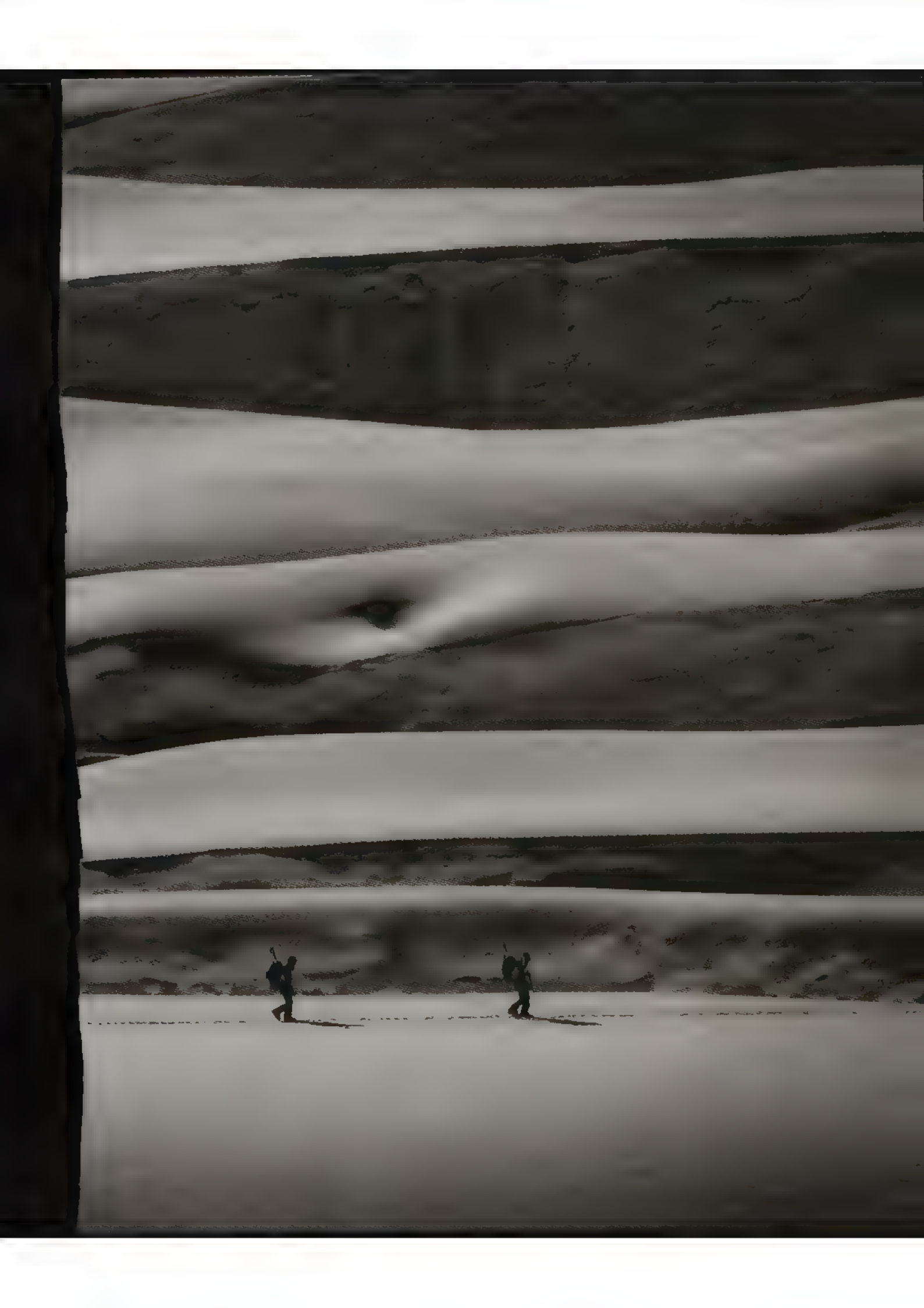
In a radio-free zone in the shadow of Green Bank Telescope, a community thrives off the grid.

**I**F GOOD FENCES make good neighbors, the Green Bank Observatory is the best neighbor of all for those longing to go off the grid. It dwells in the heart of a 13,000-square-mile U.S. National Radio Quiet Zone created to make sure that the Green Bank Telescope—the world's largest fully steerable radio telescope—can operate without interference. Sounds from space can be rather faint, and noise created here on Earth can obscure them. In Green Bank, West Virginia, citizens can enjoy the same lack of interference, without the clutter of anything that uses electromagnetic radio waves, from cell phones to wireless clocks to remote-controlled garage doors to Wi-Fi. The ban's not a problem for Green Bank's citizens: It's a boon. "We enjoy coming here where we don't have people say, 'Give me your cell phone number.' Do you have Facebook? Do you have Twitter? No we don't," Green Bank resident Linda Ramsden told *The Atlantic*.

Those self-diagnosed as "electrosensitive"—a condition where sufferers attribute nausea, headaches and even seizures to the use of electronic devices—have been flocking to the hamlet in recent years to escape the digital world, too. Since the scientific community doesn't acknowledge their ailment, they've taken treatment into their own hands and gotten out of Dodge altogether. The radiation refugees have a community about 150 strong so far. "Life isn't perfect here. There's no grocery store, no restaurants, no hospital nearby," local Diane Schou told *Slate*. "But here, at least, I'm healthy. I can do things. I'm not in bed with a headache all the time."

Radio-sensitive or not, there's an allure to going off the grid in a place like Green Bank for those who don't want to go it alone: A built-in community of like-minded folks, living with minimal electricity and access to only a pay phone in case of emergency. The town is tucked between a few national forests and is therefore protected from development. There's not a cell phone tower for miles, and the town's position in an Allegheny Mountain valley keeps random stray radio waves from getting in. The Green Bank Telescope folks are serious enough to have a surveillance team do recon to hold Green Bank's 610-person population to maintaining complete radio silence. "Everyone that lives here has to sign a form stating that they will not own a microwave, or a wireless telephone or Wi-Fi. Just about anything that uses electricity could potentially cause interference to our telescopes," radio frequency technician Jonah Bauserman, who patrols the area in a truck outfitted to detect rogue radio frequency transmissions, told *The Atlantic*. The infrequent rulebreakers are simply asked to turn the offending electronics off.

For the half-century since it's been built, the observatory has proven a success, both for science and for its neighbors. "We've been able to peer back to just after the Big Bang, 13.9 billion to 14 billion years ago," Michael Holstine, operations manager, told *Governing* magazine. "We need quiet to gather all the signals that are being supplied to us by the universe. Green Bank is just about the quietest place in the country." For those looking for absolute aural peace, it all sounds pretty great.



It's tied down with rocks or dug under the snow in a way that, if the weather gets really, really bad, you've got a safe place to weather the storm, and it's not gonna blow away when you get out to go to the bathroom. A classic thing that happens to first-time winter campers is they'll build their camp, they'll throw all their gear out around the tent and then overnight it snows two feet. And chances are you've probably been able to find your big things, but you've lost your mug, and you've lost your knife. All the small things have disappeared.

**What is more important—the right camera or a cool head?**

You can plan everything, but sometimes the best photographs are spontaneous. In order to capture that, you need to make sure certain things are taken care of so that you can actually be in a position to be creative. You need to understand the challenges, where the action's gonna happen, when it's gonna happen and be ready for something spontaneous to happen, as well. A lot of that also involves training—being in good shape, being out enough. I need to spend quite a bit of time in the mountains when I'm not shooting to maintain that edge, that focus and that familiarity. And, physically, I need to be in the kind of shape where I'm not exhausted all the time chasing down whoever I'm shooting.

**What's the most scared you've ever been?**

I've had quite a few near misses, but being caught in an avalanche was probably the most prolonged

experience. I went down 2,000 vertical feet. It's not often you have the conscious experience of thinking that, "Oh, this is how I'm going to die." You realize it's finite, and you have only so much time on the planet, and what are you going to do with that time? So, I think it's a good experience if you survive it.

**Where were you?**

I was in the Tetons, in Jackson, Wyoming, and we had just finished filming, and we were heading out of the mountains and kind of let our guard down a little. We made an assessment of the snow pass, but, obviously, we made some miscalculations. I was with a very experienced team, so it wasn't from lack of knowledge. It was just one of those things where sometimes you're allowed to make a few mistakes and it's fine, and sometimes there's a situation where one miscalculation can ruin your day.

**Did you do anything in particular to make it out?**

You're told that you're supposed to fight your way out. You have to try to stay above the debris. This was a Class 4 avalanche, so there wasn't much chance to do much about it. It was massive—the entire side of the mountain came down and funneled and then it eventually opened up and the debris spread out at the bottom. I was really lucky that I got pushed out to the top of the debris. A lot of people die from trauma—from hitting a rock or a tree, or getting torn apart. You can be in a really small avalanche and that can happen. You can be in a really small avalanche and

be covered with just six inches of snow and asphyxiate. I easily could have been buried under 25 feet of snow. But, somehow, I ended up on top of the slide when it stopped. But during the course of the avalanche, I was, at certain points, under 10 or 20 feet of snow, and I felt like I was gonna get torn apart. I mean, you're getting pushed around by the weight of buildings. Or maybe not buildings, but like 200 buses—maybe more like 1,000. I don't even know. The debris field at the bottom was 1,000 feet across. Hundreds of thousands of tons of snow.

**Do you always have a little bit of fear on a shoot?**

Well, fear is built into us for a good reason. But there's healthy and unhealthy fear. There's fear that's debilitating. That doesn't help you. There's fear that is irrational. There's fear that is based on perceived risks, which are different than real risks. Fear is meant to keep you alive, but shouldn't dictate your decisions.

**What drives you to go on that next assignment?**

I think everybody has that drive to push themselves and see where they land. You wanna have that satisfaction of doing something challenging. Some of it's as simple as being in a really beautiful place. Some of it has to do with the physicality and the experience of pushing my body. Some of it is purely emotional, in the satisfaction to accomplish a goal that I set out to do. When all of those things come together there's a level of heightened awareness and purpose that is really insatiable for me.

**ORIENTAL**

A Bedouin tends his fire in his tent in the Negev Desert—an unforgiving sandy expanse that covers more than half of Israel's land but houses less than 10 percent of its inhabitants.





underneath the kindling. This is my preferred method for several reasons: 1) it is a very stable structure, 2) the supporting fuel log can act as a wind-break and 3) larger pieces are immediately heated for quicker ignition.

Other fire-lays allow you flexibility for your situation, such as the **"STAR" (2)** campfire. In the star set-up, logs are arranged in a radial fashion and provide the same benefit as a lean-to, but with the added advantage that the logs can vary in length so they can be pushed into the center as they are consumed. This fire-lay comes in handy when you are caught without an ax or are otherwise unable to cut the logs into shorter lengths.

Another adaptable fire-lay is the **"BUNDLE-UP" (3)**. It can be made without tools using broken pieces of wood, which you wrap together with vines, cording or wire. Longer pieces are placed on the outside, so it creates a bowl for a mound of kindling and tinder. Binding the bundle low allows for the longest burn time. The big advantage of the bundle-up is that it raises the fire off the ground, making it extremely useful in watery areas.

Even if you get a fire started, weather and wet conditions can kill it fast. In snow or swamps, I suggest building a fire-proof platform of green logs and soil. In rainy regions, a thatched roof or large, flat rocks positioned above the fire-lay can act as an umbrella. In windy conditions, a trench can keep your fire aerated but out of the way of gusts. An alternative in windy conditions is a **"DAKOTA HOLE" (4)**—a U-shaped burrow that has two openings on the ground surface that connect below. The fire is built in one of the openings and will draw the air it needs to sustain it through the adjoining hole. When fire is needed on a wooden structure like a deck or floor, a thick earthen pad made of soil can be constructed as a makeshift hearth to preserve the structure.

In all of these cases, safety measures should be taken when building a fire, and I always advocate having an open container of water close by. In a domestic situation, it's best to make a fire pit or hearth, and if you're on the move, when you're ready to move on, make sure the fire is completely extinguished and follow the ethics of "leave no trace."



**BASIC RULE** of survival situations: Don't immediately exhaust yourself coming up with a shelter. Despite common belief, shelter isn't at the top of the list of essential needs according to top survival experts—fire is. In snowy or windy conditions, shelter can shoot to second, however. And in any situation, establishing a shelter can go a long way to providing peace of mind. Foxes have fur, geese have down. "A lot of animals don't need shelter, but we do," says Ray Mears, survivalist and founder of Woodlore, a school that teaches bushcraft. But humans have to be smart about it, too. "We have to have an intellectual response to our environment," adds Mears. The key is coming up with an ad hoc asylum that suits your situation and doesn't drain your internal battery.

#### Wood is Good

An abundance of wood, particularly dead branches and other foliage you can easily gather off the ground, can indicate a good shelter site. "Regardless of the environment, most people seeking shelter in the wild are injured and hypothermic," says Tony Nester, who has helped train military special operations units in desert survival and currently works as an instructor for Ancient Pathways survival school in Arizona. By selecting a spot where you can gather all the material you need to build your structure and fuel a fire, you conserve precious energy and increase your chances of survival.

#### Get High

Nester suggests you avoid setting up camp in the bottom of a valley or any other low area. Flash floods and other drainage can easily annihilate structures built on these sites. Avoiding areas of low elevation will also help you avoid hypothermia. "It could be 25 degrees at the bottom of a little meadow and 20 degrees warmer just a couple of hundred of yards farther up," says Nester.

#### Keep Liquid at Arm's Length

When searching for a suitable site, keep your eyes peeled for bodies of water, such as a lake or

creek. Beyond the obvious benefit of staving off the specter of dehydration, water sources tend to teem with wildlife such as fish and land animals attracted to the life-giving resource. But avoid the mistake of giving your shelter a waterfront view, adds Mears. Insects tend to congregate there. Plus, if you camp out right next to the river, "you're going to wake up covered in dew," says Mears—and a wet body is a cold, potentially hypothermic body. "You can tell if the spot you've chosen sits above the dew line by feeling the soil and assessing the ground's dampness."

#### Think Small

When it comes to constructing a shelter, size matters. Trying to build a wigwam big enough to house a family of five will leave you not only exhausted but with a shelter too large for your body heat to warm efficiently, says Nester. Think of it more as fashioning a glorified nest for yourself. One option Nester offers is a simple hut of natural debris and wood with a hollowed-out space just large enough for you to fit in. Then let your body heat get to work. According to *Field & Stream*, more time, energy and expertise can garner you a lean-to made by lashing together wood to form a large square that you can lean against a log or partly-fallen tree to protect you from wind and rain while trapping the heat of your fire. Double the lean-to and lash it together and you get an A-frame, the go-to shelter of Les Stroud, a.k.a. Survivorman. "It's a very adaptable shelter to just about any situation," Stroud says.

#### Expand Your Idea of Shelter

If you don't have the time or ability to construct a shelter, shimmying into a large hollow log or tree can serve in a pinch, says Mears. Just remember, warns Nester, that any natural spot which strikes you as a good place to get out of the elements probably looked that way to other creatures as well. These can range from annoying to deadly, depending on your location. "Your body heat starts to wake up creatures in the ground laying dormant," he says. "Rock piles in the southwest are notorious for harboring scorpions and rattlesnakes, for example."

**THE ITEMS, WAYS AND MEANS THAT ASSURE  
YOU A SOUND PLACE TO LAY YOUR HEAD.**

**PITCH BLACK**

A climber hunkers down for the night before an attempt to climb Mount Everest. George Mallory, who famously died on its slopes 90 years ago, said of his reason to go up: "Because it's there."

## Introduction

I have endured all types of wilderness extremes, from frostbite and hypothermia to dangerously hot and dry conditions, from deserts to the Arctic. Surviving harsh conditions is not easy or fun. While the magic of nature is beautiful, the reality is that you may perish if you have not prepared yourself for basic human survival.

Do you know about edible plants and bugs, wilderness travel, building fires in all types of weather, identifying safe drinking water or hundreds of other skills and techniques to help you survive? If you answer 'no' to any of the above, this special issue of *Newsweek* was written for you. It combines outstanding international expert advice with personal experiences and stories to highlight tips you need to survive in the most dangerous conditions. It answers some of the most common survival questions and provides guidance on preparing for challenging outdoor experiences.

The natural world enriches our lives and there are hundreds of benefits to living off the land, but when you're confronted with a survival situation, you must be prepared to beat incredible odds to become a survivor.

Les Stroud

—“SURVIVORMAN” LES STROUD

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#### FROZEN FISH

"Ice fishing, like here in Lake  
Winter, Alaska, often involves  
traversing snow and ice.

"The danger is your own  
exhaustion," says Las Stroud.

"Walking in deep snow is a skill  
set that requires experience.  
People think they can walk in  
deep snow, and if they've never  
done it before, they're gonna be  
sweating within 60 seconds."



SPECIAL

**Newsweek**

EDITION

# OFF GRID



**EXPLORING THE END  
OF LIFE AS WE KNOW IT  
ARE YOU PREPARED?**

INTRODUCTION BY "SURVIVORMAN" LES STROUD

Display until Apr. 7, 2005



\$10.99



# NICE

KEEPING YOURSELF FED AND  
HYDRATED IN ANY SITUATION

## FISH FOOD

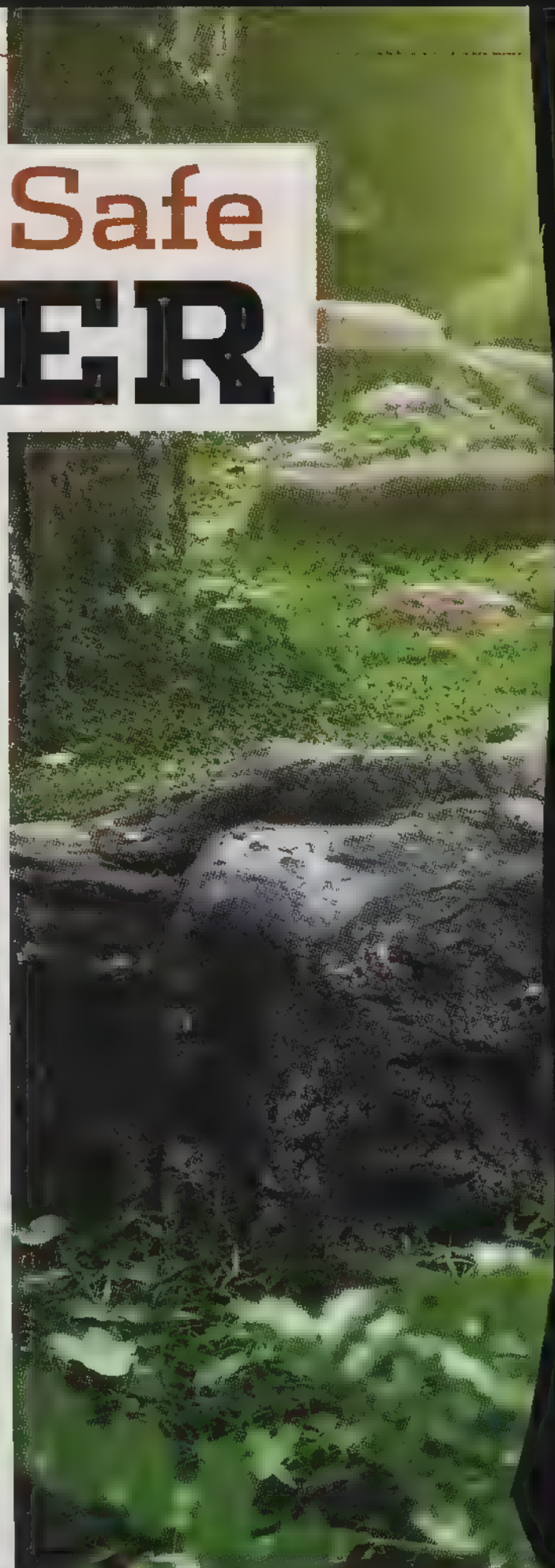
According to the Florida Museum of Natural History, there are approximately 27,300 species of fish known today. Most of them are edible. A few, like pufferfish, are toxic. A few others that are safe to eat, like catfish, have protective spines and spikes, so handle with care.

# Finding Safe WATER

**H<sub>2</sub>O is essential in any survival situation, and being smart about hydration can keep you alive.**

**A****FTER EXPOSURE** to extreme temperatures, one of the most immediate threats to a person's life when they've gone off-grid is not having enough water. According to survival expert John Hudson, a Land, Sea and Extreme Environment Survival instructor at the U.K. Defence SERE Training Organisation, "If you're sitting, waiting to get rescued under a lovely apple tree on a balmy, nice summer day that's not too hot, not too cold—just right for where we evolved—you will still lose a liter and a half of water that day." Of that, some is lost just by breathing, another half-liter through urination, half a liter through sweat, and nearly a third will be lost through what Hudson calls "insensible perspiration." "As it evaporates from your skin, you don't even know it's happening." In a bug-out scenario where someone is afraid for his or her life, that amount will likely be even higher, making hydration an even more immediate necessity.

"As a good general rule, I'd like to see someone on minimal rations consuming at least four liters of water a day in a demanding situation," says Ben McNutt, a survival expert who operates Woodsmoke Bushcraft and Wilderness Survival. "This potentially could be a lot more depending on work rate and ambient





#### SLEEPING BAG

In cold environments a tent should be large enough that the head and feet don't touch the sides, climber Ed Viesturs told *National Geographic News*. A too-small tent means your feet will chill pressed against the surface, which a dream-induced kick could rupture.

## SHELTER



### CAYENNE PEPPER

For deep cuts with uncontrolled bleeding, pack powdered cayenne pepper into the cut. It'll sting, but will stop the blood from flowing out. Combined with oil, it also makes an effective joint pain rub.



### TWO-BY-FOURS

When secured with an ace bandage, 2x4s pre-cut in different lengths for arms and legs can become an ad hoc cast to stabilize a break.

### CINNAMON

Far from just a tasty spice, cinnamon can help bring down blood pressure and regulate glucose naturally.



### GINGER

When fresh, ginger is an anti-inflammatory, a blood thinner and a powerful digestive aid for an upset stomach.



Gwenn Scott, N.D., offers home and garden emergency remedies.

# Nature's

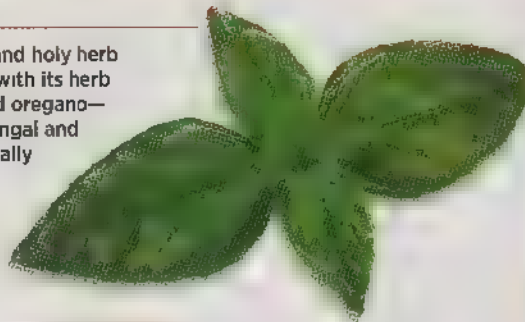


### GRAPEFRUIT SEEDS

Grapefruit seed oil diluted in water—either ingested or applied externally—can act as an antibiotic against up to 45 different kinds of bacteria. Seeds can also be chewed.

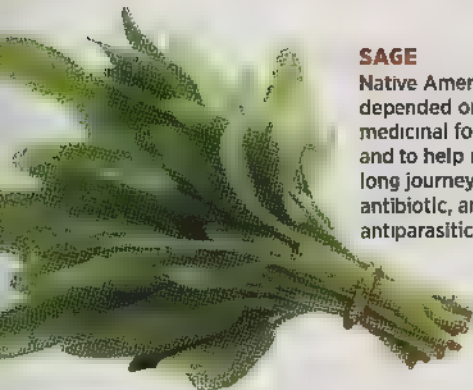
### BASIL

Considered a sacred and holy herb in India, basil—along with its herb counterparts sage and oregano—is an antibiotic, antifungal and antiparasitic. Eat liberally.



### GARLIC

Hippocrates called garlic the number one medicinal. Fresh or powdered, it can thin the blood, and a broth made of it can be a multi-use healer.



### SAGE

Native Americans long depended on sage as a medicinal for snake bites and to help retain fluids on long journeys. It's also an antibiotic, antifungal and antiparasitic.

### COLLOIDAL SILVER

Nostrodamus may have put silver cutlery in wells during the plague. He had a reason: When dispersed in water and consumed, molecules of silver are said to attach to bacteria, viruses and fungi that have invaded your body and kill them.



### BEER

To combat diarrhea and gastrointestinal distress—up to and including dysentery—drink two beers a day.



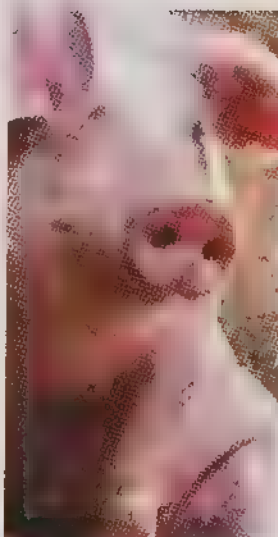
# Best ANIMAL Sidekicks

A species breakdown of man's best friend for going off the grid.



## Wolf Hybrids

The *Wall Street Journal* recently reported that the Louisiana State Penitentiary in Angola is using a new type of guard canine: a cross between a wolf and a Malamute. It's proven effective against prisoners and not a single one yet has tried to outrun them. Lou Cruz, who's serving life for murder, told *WSJ*, "You might run, but they're going to catch you." Warden Burl Cain thinks a wolf hybrid's most powerful asset is psychological intimidation. "The wolf ate Grandma," Cain said.



## Pigs

Pigs have been proving their utility off the plate. Pet pig Pru rescued her owner from a bog, reported *The Huffington Post*. HuffPo also noted Priscilla, who saved a boy from drowning; Spammy, whose squeals alerted firefighters to a calf in a burning shed; and LuLu, who flagged down a passing car when her owner had a heart attack. Another advantage of taking a porker off-grid: They're sneaky. They stalk other pigs to food sources and use trickery to keep their personal stashes hidden.



## Geese

Fowl might not be the first guard animals that spring to mind, but consider this: Two geese alerted Rome to an impending attack by Gaul in 390 B.C. Today, police in parts of China's Xinjiang province use geese as night guards at stations. Humans have three color sensors; birds go one better, adding ultraviolet. Geese can detect smaller objects, are better at picking up movement and are more territorial than humans. Once they hone in on an intruder, they make loud noise and they won't be distracted by anything, including food bribes.

like the Indian, "You are not lost; it is the teepee that is lost." It isn't serious. It cannot be so unless you do something foolish.

**6.** The worst thing you can do is to get frightened. The truly dangerous enemy is not the cold or the hunger so much as the fear. It is fear that robs the wanderer of his judgment and of his limb power; it is fear that turns the passing experience into a final tragedy. Keep cool and all will be well.

**7.** The simplest plan, when there is fresh snow and no wind, is to follow your own track back. No matter how far around or how crooked it may be, it will certainly bring you out safely.

**8.** All things considered, it is usually best to stay right where you are, especially if in a wild country where there is no chance of finding a farm house. Make yourself comfortable for the night by gathering plenty of good wood while it is daylight and building a wind screen on three sides, with the fire in front, and something to keep you off the ground. Do not worry, but keep up a good fire.... A good fire is the best friend of a lost man.

**9.** It is easy to make a friction fire, if you know how, and hopeless if you don't.... The surest and easiest method of making a friction fire is by use of the bow-drill. Two sticks, two tools and some tinder are needed.

**10.** When in the grinding the dust that runs out of the notch is coarse and brown, it means that the wood is too soft; when it is very fine and scanty it means that the wood is too hard.



**THE BOY SCOUTS HANDBOOK**  
The Boy Scouts Handbook (at left, from 1911)—which from inception included instruction in navigation—became an instant bestseller and sold 100,000 copies every year until 1914. By 1935, 5 million were sold.

**11.** There are thousands of different kinds of toadstools or mushrooms in the world, most of them are good to eat, yet all have a bad reputation because some are deadly poisonous.

**12.** Every scout ought to know the principal wild animals that are found in North America. He need not know them as a naturalist, but as a hunter, as a camper.

**13.** Observe these two rules given by an old woodsman:  
(1) Never walk over anything you can walk around; (2) never step on anything you can step over.

**14.** Reach the place where you are going to spend the night in plenty of time to build your lean-to, and make your bed for the night. Select your camping spot with reference to water, wood, drainage and material for your lean-to.

**15.** If you have to choose between a bright clear stream which may be polluted at some point above and a pond full of dead leaves and peaty matter, but which you can

inspect all around and find free from contamination, choose the pond.

**16.** If you keep your head from getting hot and your feet dry there will be little danger of sickness.

**17.** If you work your hands like paddles and kick your feet, you can stay above water for some time even with your clothes on. It requires a little courage and enough strength not to lose your head.

**18.** A sudden shower is soon over. A slow rain lasts long.

**19.** To secure endurance, physical power, physical courage and skill, the first thing needful is to take stock of one's physical make-up, put the body in the best possible condition for doing its work and then keep it in good order.

**20.** Pain means something is wrong. It may be brave to bear it, but it is not wise.

*All text abridged from the Boy Scouts Handbook, The First Edition, 1911.*

OFF THE GRID

# SUSTENA



**How'd you start with methane?**

I started a biodigester in my bathroom using my baby's diaper waste. I knew there were all these organisms in that material the baby was creating. I'd take the food waste the baby didn't eat, and I'd put those in the biodigester and the organisms would eat the food waste and then fart out methane. I had this stomach I created out of plastic in the bathroom, and it farts and it also pees out this liquid fertilizer. You can burn it on a stove and you can run electric generators off of it so you can run lights, gas lamps, refrigerators—it's true natural gas. And then eventually you have a sludge that builds up that you can dry and it's soil. Three byproducts—methane, fertilizer and soil—that are fantastically useful and you don't have to worry about waste treatment.

**How does all this translate into turning on lights and ovens?**

You store the methane in a balloon or a plastic bag, and we use a hose to deliver it. In India, we used garden hoses, and, here in the U.S., we go to Home Depot and get the clear plastic hoses people use in their aquariums. If we want to create pressure, we get biogas pumps from China, which have an inlet and an outlet so you can plug a tube in one side and then it pumps it out the other. You can turn any stove into a biogas stove.

**Would this work for people who want to live off the energy grid?**

If you've got a kitchen and a toilet, you've got all the makings

of a biogas system. A family of four to six produces enough waste, both toilet and food—you can keep them separate or you can combine them—to cook for about two hours a day or run a generator for about 45 minutes a day, which you can use to charge batteries to run lights for many, many hours. And that's just on the waste they produce. Now if they went out and hunted and gathered great sources of biogas that are just piling up to rot—grass clippings, fruit fall, animal waste—they begin to get to the point where they can probably

garbage disposals are the most important technological achievement of the 21st century because you grind up the food waste and then you can turn it into soil in three to six days instead of composting it for three to six months, or you can turn it into biogas in 24 hours. And no rats, raccoons, dogs, cats or other animals have interest in it after it's been ground up. It all belongs to the microbes.

**Can you mess up the recipe?**

Yeah. It's a stomach and people tend to overfeed it and then it

**"If you've got a kitchen and a toilet, you've got all the makings of a biogas system."**

heat water for bathing as well and generate emergency backup electricity. Could a prepper live 100 percent off-grid? Yes.

**What about places that are snow-covered?**

You can put a big tarp over a permafrost lake and it bubbles constantly and you capture that gas and you use it—they're starting to do that in some parts of Scandinavia. The microbes are there. It's all been a question of how much organic material is available at any given time, and, at most cold temperatures, the microbes are producing gas very slowly.

**What can we do to maximize our daily energy output?**

I've said that InSinkErator

goes sour and won't produce methane anymore and starts to produce carbon dioxide. Then you have a couple of options: 1) stop feeding it and wait until it recovers, which will take several weeks, 2) dump in sodium bicarbonate or antacid and wait for it to start again 3) drain it and refill it with more manure or lake mud to get it started again. If you have a system that has toilet waste going in all the time, or animal waste of any kind, you almost never have to do anything, but many communities don't want to do that because of psychological taboos.

**Can you store it?**

It's natural gas. It can be stored for millions of years. It'll be as good as the day you produced it.

**DOGS ARE  
DOING BETTER**

"Dogs (here, a Siberian Husky) have co-evolved with humans for at least 12,000 years," Andrew Luescher, director of the Animal Behavior Clinic at Purdue University, told *Nature*. "Dogs are better than any other animal at reading human body language."





underneath the kindling. This is my preferred method for several reasons: 1) it is a very stable structure, 2) the supporting fuel log can act as a wind-break and 3) larger pieces are immediately heated for quicker ignition.

Other fire-lays allow you flexibility for your situation, such as the **"STAR" (2)** campfire. In the star set-up, logs are arranged in a radial fashion and provide the same benefit as a lean-to, but with the added advantage that the logs can vary in length so they can be pushed into the center as they are consumed. This fire-lay comes in handy when you are caught without an ax or are otherwise unable to cut the logs into shorter lengths.

Another adaptable fire-lay is the **"BUNDLE-UP" (3)**. It can be made without tools using broken pieces of wood, which you wrap together with vines, cording or wire. Longer pieces are placed on the outside, so it creates a bowl for a mound of kindling and tinder. Binding the bundle low allows for the longest burn time. The big advantage of the bundle-up is that it raises the fire off the ground, making it extremely useful in watery areas.

Even if you get a fire started, weather and wet conditions can kill it fast. In snow or swamps, I suggest building a fire-proof platform of green logs and soil. In rainy regions, a thatched roof or large, flat rocks positioned above the fire-lay can act as an umbrella. In windy conditions, a trench can keep your fire aerated but out of the way of gusts. An alternative in windy conditions is a **"DAKOTA HOLE" (4)**—a U-shaped burrow that has two openings on the ground surface that connect below. The fire is built in one of the openings and will draw the air it needs to sustain it through the adjoining hole. When fire is needed on a wooden structure like a deck or floor, a thick earthen pad made of soil can be constructed as a makeshift hearth to preserve the structure.

In all of these cases, safety measures should be taken when building a fire, and I always advocate having an open container of water close by. In a domestic situation, it's best to make a fire pit or hearth, and if you're on the move, when you're ready to move on, make sure the fire is completely extinguished and follow the ethics of "leave no trace."

# 7 Things I Learned from THE BEDOUINS

The nomadic tribe has nailed bedding down in the desert.

**T**HE BEDOUINS, Arabic-speaking nomadic peoples who have endured since the seventh century, populate some of the world's hottest places, including the deserts of North Africa, the Arabian Peninsula, Israel, Iraq, Syria and Jordan. 160,000 live in the Negev alone. In fact, *badu* is Arabic for desert. Though relatively small in population, Bedouins hold sway over a disproportionately large land area, great swaths that most find too unrelentingly scorching to settle in. There's much these nomads can teach us about weathering inhospitable heat.

## 1. They know the sun is colorblind.

A seminal study published in *Nature*, in 1980, "Why Do Bedouins Wear Black Robes in Hot Deserts?" revealed the method behind their sometimes goth-like getups. "It seems likely," the scientists wrote, "that the present inhabitants of the Sinai, the Bedouins, would have optimized their solutions for desert survival during their long tenure in this desert.... We have therefore investigated whether black robes help the Bedouins to minimize solar heat loads in a hot desert." After measuring a volunteer "standing facing the sun in the desert at midday while he wore: 1) a black Bedouin robe; 2) a similar robe that was white; 3) a tan army uniform; and 4) shorts" in temperatures from 95°F to 115°F, "the amount of heat gained by a Bedouin exposed to the hot desert is the same whether he wears a black or a white robe. The additional heat absorbed by the black robe was lost before it reached the skin," posited the findings. The looseness of the Bedouins' robes lets cooling happen through convection: by a bellows action, as the robes blow in wind, or by a chimney effect, as the air rises passing over the skin.

## 2. Their view on backyard gardens is expansive.

Most Bedouins are herders, gravitating toward the desert during the rainy winters. They keep their camels, goats or cattle on the move to keep them in pasture. But they also plant grain along regular migration routes to harvest on the return trip.

## 3. They have a shelter to cover every season.

In summer, portable tents allow the flexibility to move at a moment's notice. At wintering grounds they return to annually, stone houses are common.

## 4. They know the ins and outs of weaving.

On the shadeless plains and mountains of the Sinai and Wadi Rum, where temperatures can spike above 120°F, the tents are crafted of coarsely woven goat hair. The open weave acts like a breathing membrane, letting heat dissipate. As the sun beats down on the black fabric, hot air is drawn upward through the tiny openings in the weave, creating the near-equivalent of a breeze.

## 5. They're masters of shade.

The tents' black color maximizes the creation of deep shade, but the coarse weave lets in just enough sunlight to illuminate the interior.

## 6. They're prepared for precipitation.

When it rains and snows, the woven fibers swell, closing up the tiny holes created by the coarse weave and making the tent watertight.

## 7. They build with adaptability in mind.

The tent's southern and northern sides are at a fixed angle, but the western wall is flexible enough to be pulled all the way up or clamped to the ground when wind or dust kicks up. The eastern side falls straight from the roof to the ground, offering protection from rain and strong gusts.

# A Place Out Of THE SUN

In a radio-free zone in the shadow of Green Bank Telescope, a community thrives off the grid.

**I**F GOOD FENCES make good neighbors, the Green Bank Observatory is the best neighbor of all for those longing to go off the grid. It dwells in the heart of a 13,000-square-mile U.S. National Radio Quiet Zone created to make sure that the Green Bank Telescope—the world's largest fully steerable radio telescope—can operate without interference. Sounds from space can be rather faint, and noise created here on Earth can obscure them. In Green Bank, West Virginia, citizens can enjoy the same lack of interference, without the clutter of anything that uses electromagnetic radio waves, from cell phones to wireless clocks to remote-controlled garage doors to Wi-Fi. The ban's not a problem for Green Bank's citizens: It's a boon. "We enjoy coming here where we don't have people say, 'Give me your cell phone number.' Do you have Facebook? Do you have Twitter? No we don't," Green Bank resident Linda Ramsden told *The Atlantic*.

Those self-diagnosed as "electrosensitive"—a condition where sufferers attribute nausea, headaches and even seizures to the use of electronic devices—have been flocking to the hamlet in recent years to escape the digital world, too. Since the scientific community doesn't acknowledge their ailment, they've taken treatment into their own hands and gotten out of Dodge altogether. The radiation refugees have a community about 150 strong so far. "Life isn't perfect here. There's no grocery store, no restaurants, no hospital nearby," local Diane Schou told *Slate*. "But here, at least, I'm healthy. I can do things. I'm not in bed with a headache all the time."

Radio-sensitive or not, there's an allure to going off the grid in a place like Green Bank for those who don't want to go it alone: A built-in community of like-minded folks, living with minimal electricity and access to only a pay phone in case of emergency. The town is tucked between a few national forests and is therefore protected from development. There's not a cell phone tower for miles, and the town's position in an Allegheny Mountain valley keeps random stray radio waves from getting in. The Green Bank Telescope folks are serious enough to have a surveillance team do recon to hold Green Bank's 610-person population to maintaining complete radio silence. "Everyone that lives here has to sign a form stating that they will not own a microwave, or a wireless telephone or Wi-Fi. Just about anything that uses electricity could potentially cause interference to our telescopes," radio frequency technician Jonah Bauserman, who patrols the area in a truck outfitted to detect rogue radio frequency transmissions, told *The Atlantic*. The infrequent rulebreakers are simply asked to turn the offending electronics off.

For the half-century since it's been built, the observatory has proven a success, both for science and for its neighbors. "We've been able to peer back to just after the Big Bang, 13.9 billion to 14 billion years ago," Michael Holstine, operations manager, told *Governing* magazine. "We need quiet to gather all the signals that are being supplied to us by the universe. Green Bank is just about the quietest place in the country." For those looking for absolute aural peace, it all sounds pretty great.



# Human(fure) ENERGY

National Geographic emerging explorer T.H. Culhane talks about harnessing the power of poo.

## Break down your take on trash and poop.

In the field of industrial ecology, the mantra is that, in nature, there is no waste. And we are a part of nature. Everything we produce is a material. We produce energy and matter and it comes back around and is transformed into something else. My insight is that we are almost self-contained biospheres. We're pulling materials into our nests and then we're excreting—if you like—urine, fecal matter, sweat, lemon peels and banana peels

and avocado pits and onion skins and the food that we didn't eat that was still on our plate. My study is harvesting this stuff that other people have ignored.

## What is biogas and what's so great about it?

Biogas [fuels like methane produced by the breakdown of organic matter] is the most ancient simple hydrocarbon. It's what dominated the Earth's atmosphere when this planet began. There's methane everywhere in the universe, but

Earth was almost completely dominated by methane until microbes began to produce oxygen. At that time, the methane-producing organisms went into hiding because they can't stand oxygen—it's a poison to them. So they went down into ocean sediments and deep into rock and that's why we have so much natural gas; they're still there, churning, making the stuff. And we have them living in our guts, in our intestines, in our stomachs, and so does every multicellular life form.

It's tied down with rocks or dug under the snow in a way that, if the weather gets really, really bad, you've got a safe place to weather the storm, and it's not gonna blow away when you get out to go to the bathroom. A classic thing that happens to first-time winter campers is they'll build their camp, they'll throw all their gear out around the tent and then overnight it snows two feet. And chances are you've probably been able to find your big things, but you've lost your mug, and you've lost your knife. All the small things have disappeared.

**What is more important—the right camera or a cool head?**

You can plan everything, but sometimes the best photographs are spontaneous. In order to capture that, you need to make sure certain things are taken care of so that you can actually be in a position to be creative. You need to understand the challenges, where the action's gonna happen, when it's gonna happen and be ready for something spontaneous to happen, as well. A lot of that also involves training—being in good shape, being out enough. I need to spend quite a bit of time in the mountains when I'm not shooting to maintain that edge, that focus and that familiarity. And, physically, I need to be in the kind of shape where I'm not exhausted all the time chasing down whoever I'm shooting.

**What's the most scared you've ever been?**

I've had quite a few near misses, but being caught in an avalanche was probably the most prolonged

experience. I went down 2,000 vertical feet. It's not often you have the conscious experience of thinking that, "Oh, this is how I'm going to die." You realize it's finite, and you have only so much time on the planet, and what are you going to do with that time? So, I think it's a good experience if you survive it.

**Where were you?**

I was in the Tetons, in Jackson, Wyoming, and we had just finished filming, and we were heading out of the mountains and kind of let our guard down a little. We made an assessment of the snow pass, but, obviously, we made some miscalculations. I was with a very experienced team, so it wasn't from lack of knowledge. It was just one of those things where sometimes you're allowed to make a few mistakes and it's fine, and sometimes there's a situation where one miscalculation can ruin your day.

**Did you do anything in particular to make it out?**

You're told that you're supposed to fight your way out. You have to try to stay above the debris. This was a Class 4 avalanche, so there wasn't much chance to do much about it. It was massive—the entire side of the mountain came down and funneled and then it eventually opened up and the debris spread out at the bottom. I was really lucky that I got pushed out to the top of the debris. A lot of people die from trauma—from hitting a rock or a tree, or getting torn apart. You can be in a really small avalanche and that can happen. You can be in a really small avalanche and

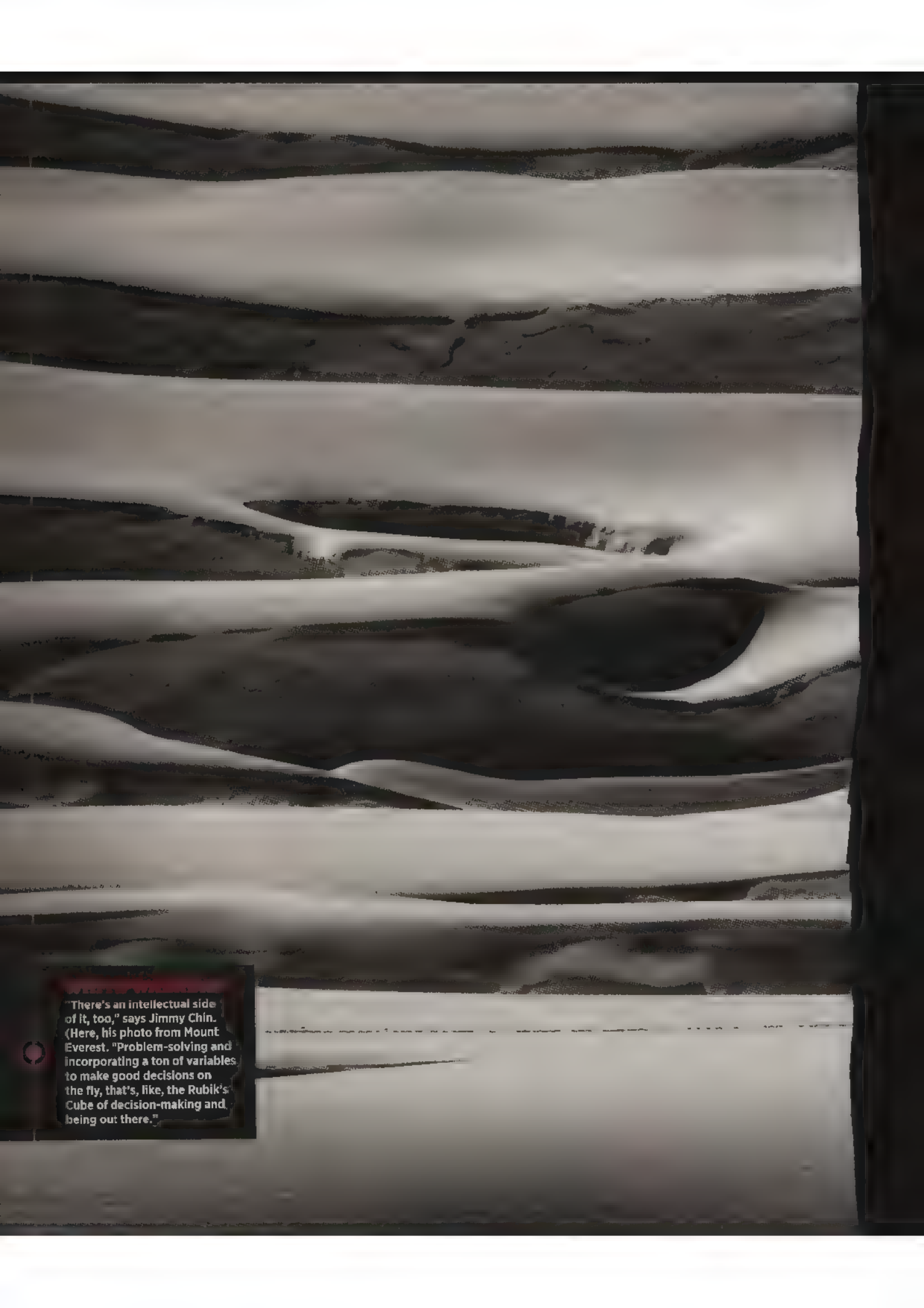
be covered with just six inches of snow and asphyxiate. I easily could have been buried under 25 feet of snow. But, somehow, I ended up on top of the slide when it stopped. But during the course of the avalanche, I was, at certain points, under 10 or 20 feet of snow, and I felt like I was gonna get torn apart. I mean, you're getting pushed around by the weight of buildings. Or maybe not buildings, but like 200 buses—maybe more like 1,000. I don't even know. The debris field at the bottom was 1,000 feet across. Hundreds of thousands of tons of snow.

**Do you always have a little bit of fear on a shoot?**

Well, fear is built into us for a good reason. But there's healthy and unhealthy fear. There's fear that's debilitating. That doesn't help you. There's fear that is irrational. There's fear that is based on perceived risks, which are different than real risks. Fear is meant to keep you alive, but shouldn't dictate your decisions.

**What drives you to go on that next assignment?**

I think everybody has that drive to push themselves and see where they land. You wanna have that satisfaction of doing something challenging. Some of it's as simple as being in a really beautiful place. Some of it has to do with the physicality and the experience of pushing my body. Some of it is purely emotional, in the satisfaction to accomplish a goal that I set out to do. When all of those things come together there's a level of heightened awareness and purpose that is really insatiable for me.



“There’s an intellectual side of it, too,” says Jimmy Chin. (Here, his photo from Mount Everest. “Problem-solving and incorporating a ton of variables to make good decisions on the fly, that’s, like, the Rubik’s Cube of decision-making and being out there.”)



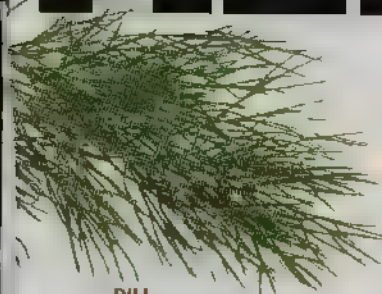
**CLOVE CAPSULE**  
A known combatant of ingested e. coli, clove capsules are an effective antidote for food poisoning. Take one at onset and another if symptoms continue.



**ROSEMARY**  
Fresh or dried, the herb acts as a decongestant when boiled in water, with the ability to break up phlegm. It's also thought to improve memory.

Like rosemary, it's a decongestant when boiled in water, but is mostly known as a digestive aid that works by relaxing the smooth muscles in the colon.

# MEDICINE



**DILL**  
Nicholas Culpeper, a 17th century herbalist, called this digestive aid and anti-gas agent "a gallant expeller of wind."



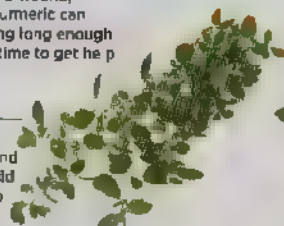
## CANNED FRENCH-STYLE GREEN BEANS

For a burn, douse it with cold water, apply the green beans, then pour the liquid from the can over the burned area. Hold for 15 minutes in a towel and repeat.

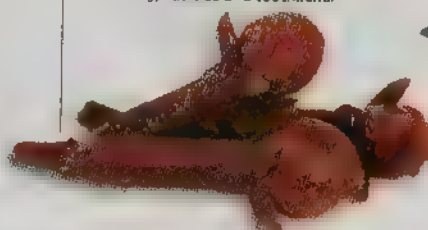


**TURMERIC**  
Like cayenne pepper but without the heat, when packed into a wound, powdered turmeric can stop bleeding long enough to buy you time to get help.

**OREGANO**  
Like garlic and its fellow herbs sage and basil, oregano should be eaten liberally to reap its antibiotic, antifungal and antiparasitic properties.



**CLOVES**  
Fresh clove can preserve pork. After dinner, clove oil keeps the dentists away, helping prevent halitosis, tooth decay, cavities and toothache.



survival and currently works as an instructor for Ancient Pathways survival school in Arizona. By selecting a spot where you can gather all the material you need to build your structure and fuel a fire, you conserve precious energy and increase your chances of survival.

## Get High

Nester suggests you avoid setting up camp in the bottom of a valley or any other low area. Flash floods and other drainage can easily annihilate structures built on these sites. Avoiding areas of low elevation will also help you avoid hypothermia. "It could be 25 degrees at the bottom of a little meadow and 20 degrees warmer just a couple of hundred of yards farther up," says Nester.

## Keep Liquid at Arm's Length

When searching for a suitable site, keep your eyes peeled for bodies of water, such as a lake or

partly-fallen tree to protect you from wind and rain while trapping the heat of your fire. Double the lean-to and lash it together and you get an A frame, the go-to shelter of Les Stroud, a.k.a. Survivorman. "It's a very adaptable shelter to just about any situation," Stroud says.

## Expand Your Idea of Shelter

If you don't have the time or ability to construct a shelter, shimmying into a large hollow log or tree can serve in a pinch, says Mears. Just remember, warns Nester, that any natural spot which strikes you as a good place to get out of the elements probably looked that way to other creatures as well. These can range from annoying to deadly, depending on your location. "Your body heat starts to wake up creatures in the ground laying dormant," he says. "Rock piles in the southwest are notorious for harboring scorpions and rattlesnakes, for example."

# What's in your BUG-OUT

Creek Stewart, author of *Build the Perfect Bug Out Bag: Your 72-Hour Disaster Survival Kit*, makes sure you have the essentials covered for a three-day emergency escape.

CAMP, SHUTTERSTOCK COURTESY NORTH  
BY VASELINE SHUTTERSTOCK

## THE BAG

Your bag doesn't have to look like it belongs on the front lines as long as it's waterproof and has plenty of storage. We like the Maxpedition Vulture II. (\$145.99 at [www.maxpedition.com](http://www.maxpedition.com))



## The Quest for FIRE

A primer on creating and sustaining a campfire  
with Survivaltek's Ken Youngquist.

**S**TARTING A FIRE is one thing. Keeping it going is another. You need to know how to achieve both. A successful campfire, or fire-lay, is the one sure thing that can keep you warm, cook your food and sanitize your water. Assuming you've brought a fool-proof source of flame with you (and two or three more for backup), having a sound basis of construction and adapting it to the situation can help you overcome adverse fire situations like wet, wind or lack of a hatchet.

The key to sustained combustion starts with building your fire-lay correctly. When creating a campfire, it should be a progression of thin to thick flammable material from tinder to kindling to fuel. Tinder might be dry grass, leaves or twigs; kindling might be pencil-size branches; and

fuel might be arm-size branches or larger logs. Because heat rises along with the flames, stack the tinder at the bottom and kindling above it. Once the fire is established, stack your fuel next to and over the flame. The materials should be placed close enough to transfer heat but loosely enough to allow air flow. Be aware of the condition of your building materials, too. Dampness, in the form of rain- or dew-soaked twigs, branches and leaves, inhibits ignition. Look under logs or under a tall pile of leaves for dry materials. Small, dead branches on tree trunks often work well. In extreme circumstances, you may have to cut into the heart of a dead log in order to find suitable dry wood.

My go-to fire-lay is called a "**LEAN-TO**" (1). Begin with a log laid on its side as a prop to hold up the kindling leaned against it. The tinder goes

# BAG?

## WATER AND FOOD

I'm a proponent of packing three liters of drinking water in your bug-out bag. At least one of those liters should be in a metal container so you have the option to boil water in that container to purify it. If you do end up having to find H<sub>2</sub>O along the way, you should also have some water purification tablets that you can tuck into a pocket; they can purify one liter per tab. As far as food, we are used to eating however much we want whenever we want, and people feel the effects of not eating within hours even though they can actually survive for three weeks without food. I'm a huge fan of packing open-and-eat meals that require zero preparation. And high-calorie energy bars like Clif Bars and PowerBars are outstanding bug-out meals.



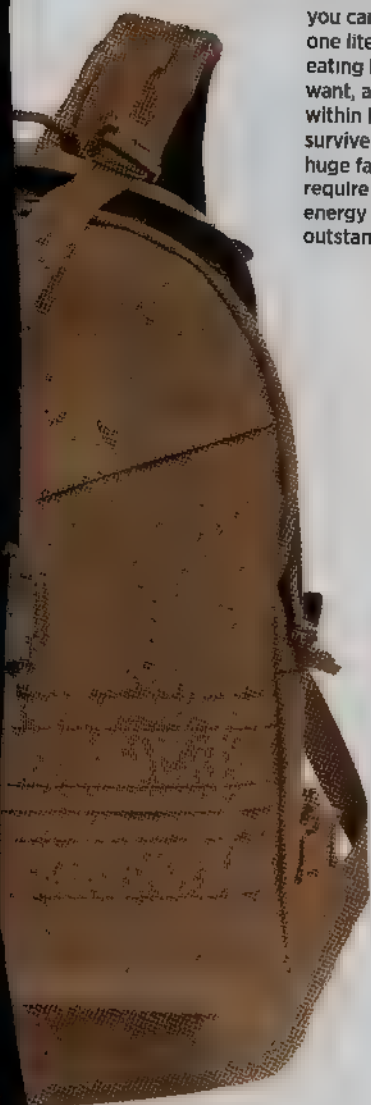
## MEDICAL

You'll see a lot of minor wound things in most survival kits, like Band-Aids, topical ointments, aspirin and things like that. But those really are just fillers and, quite frankly, aren't all that helpful in a real emergency. Survival emergencies come down to just a few categories, one of which is major blood loss. You want some kind of clotting agent and thick gauze padding. The military uses Combat Application Tourniquets (CATs) which are available for civilian use (top, \$28.99 at [Amazon.com](http://Amazon.com)). Another major category is allergic reactions. Oftentimes, people forget things like medication or EpiPens for allergies when it comes to disaster preparedness, but they could make the difference between life and death. Even Benadryl can make a big difference in an emergency when no medical attention is available.



## PROTECTION

This is a category that definitely needs to be considered. Unfortunately, there are people in this world who look at bug-out situations as an opportunity rather than what it is, which is a horrible scenario. I'm a huge fan of pepper spray, like the Tornado Pepper Spray Systems (from \$29.99 at [Gettornado.com](http://Gettornado.com)). It's really effective, it's inexpensive, it's easy to use and doesn't require any training or licenses or permits. Obviously, other categories of protection are firearms and knives—but it's really important to mention that anything you're using to defend yourself can be taken and used against you. So unless you're incredibly proficient, these might be more danger than help.

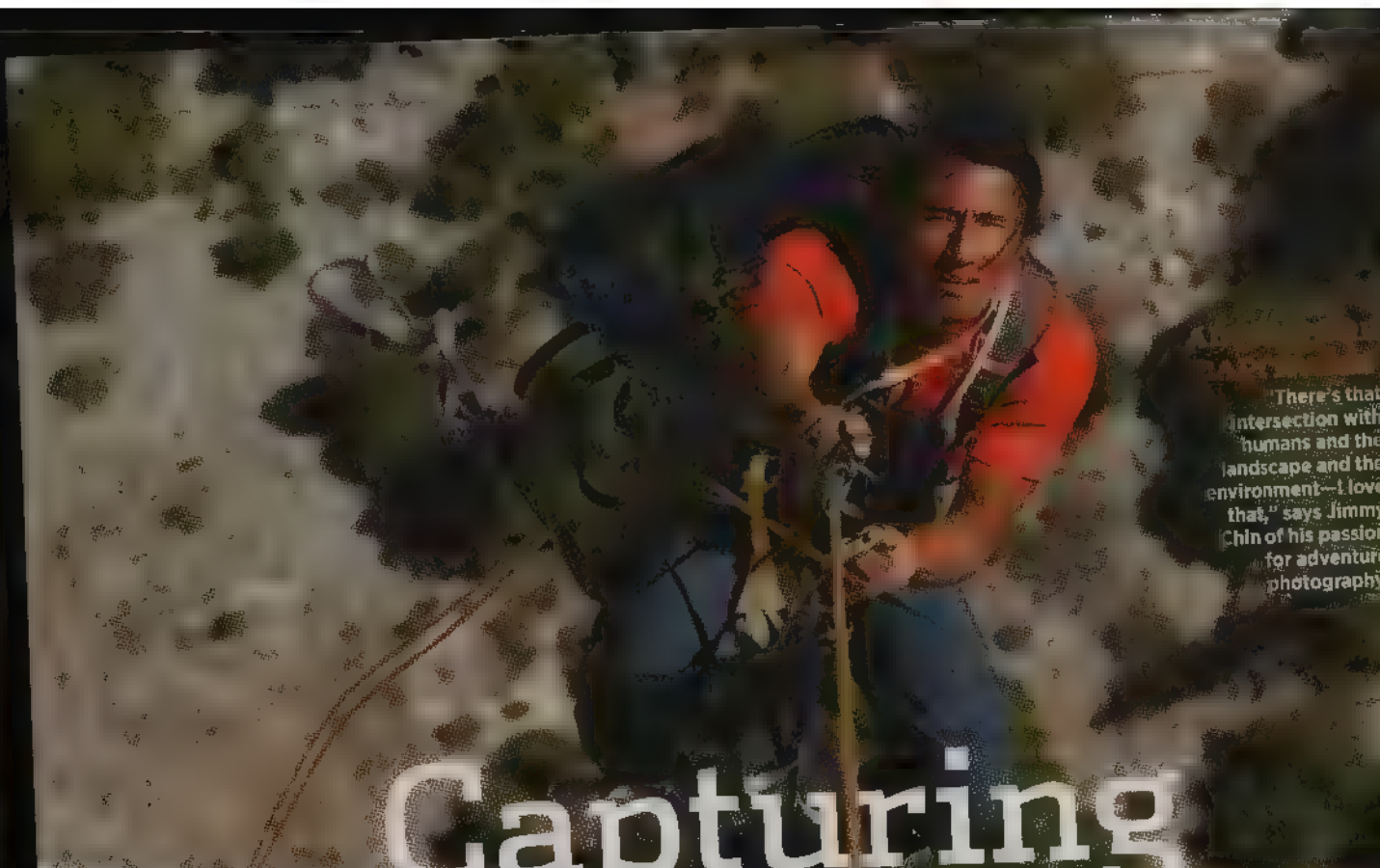


# 20 Basics from the **BOY SCOUTS HANDBOOK**

In 1911, the Boy Scouts published the first edition of their manual. The survival essentials therein still hold.



1. Be Prepared.
2. There are three qualities to a good knot: Rapidity with which it can be tied, its ability to hold fast when pulled tight and the readiness with which it can be undone.
3. The height of a tree is easily measured when on a level, open place, by measuring the length of its shadow, then comparing that with your own shadow or that of a ten-foot pole.
4. If the distance is considerable, it may be measured sometimes by sound. Thus, when a gun is fired, a man is chopping or a dog is barking, count the seconds between the sight and the hearing of the sound and multiply by 1100 feet, which is the distance sound travels in a second. Occasionally, the distance of an upright bank, cliff or building can be measured by the echo. Half the seconds between shout and echo multiplied by 1100 gives the distance in feet.
5. When you do miss your way, the first thing to remember is,



There's that intersection with humans and the landscape and the environment—I love that," says Jimmy Chin of his passion for adventure photography.

# Capturing EXTREMES

Photographer Jimmy Chin tells what it takes to survive high-risk shoots and bring back big visual rewards.

**What's the practical side of safeguarding yourself while you're not photographing?**

Well, normally, if you're hanging off a mountain, you're sleeping in a portaledge. That's an extreme example of some of the places that I end up spending the night. But, in most cases we like redundancies in our safety system, so you aren't always relying on one piece of gear. We build an anchor for the portaledge, and you're tied to it. So you can't, say, roll out of bed. I was doing a shoot in Baffin Island, north of the Arctic Circle, and there's a lot of polar bears.

So, we had to build a perimeter around the camp with electric wire and it would sound an alarm if anything crossed it. We were also carrying rifles.

**In a situation like that—where a predator wants your food—what do you do with your grub?**

It depends. If you're in the mountains and there's grizzly bears around, you definitely want to hang your food or put it in bear-proof bins. When you're out on ice, obviously there are no trees. There are so many different scenarios that it's hard to say there's any one rule, but

you always want to keep your food well-packaged—and you want to know where it is.

**Have you ever had something come up at camp, and you really had to improvise?**

You always set your camp up assuming the worst. If you think you're gonna be in a sandstorm or a windstorm, or you're in any situation in the mountains where the weather can basically change in 10 minutes, you anticipate it. Because the farther out and more remote you are, the smaller the margin for mistakes. We call it "bombproofing" your shelter.

**UNDER COVER**

A Bedouin tends his fire in his tent in the Negev Desert—an unforgiving sandy expanse that covers more than half of Israel's land but houses less than 10 percent of its inhabitants.





**THE ITEMS, WAYS AND MEANS THAT ASSURE  
YOU A SOUND PLACE TO LAY YOUR HEAD.**

**PITCH BLACK**

A climber hunkers down for the night before an attempt to climb Mount Everest. George Mallory, who famously died on its slopes 90 years ago, said of his reason to go up: "Because it's there."

#### A-LISTER

Forgoing a high-tech tent, Survivalist Les Stroud opts for a standard A-frame shelter that would be the one that would be the go-to: can-use-this-almost-anywhere kind of shelter.




# Helter SHELTER

Constructing a survival haven takes situational awareness, energy conservation and adaptability.

### FROZEN FISH

Ice fishing, like here in Lake Winter, Alaska, often involves traversing snow and ice. "The danger is your own exhaustion," says Les Stroud. "Walking in deep snow is a skill set that requires experience. People think they can walk in deep snow, and if they've never done it before, they're gonna be sweating within 60 seconds."





Travelers move through the Columbia River Gorge, Oregon, more than 1,500 feet above sea level. The gorge's river travels 12,000 miles, from the base of the Canadian Rockies to the Pacific Ocean. Humans have inhabited its banks for more than 10,000 years.

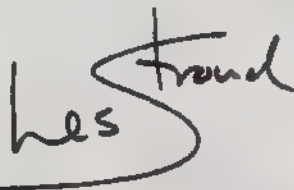


# Introduction

I have endured all types of wilderness extremes, from frostbite and hypothermia to dangerously hot and dry conditions, from deserts to the Arctic. Surviving harsh conditions is not easy or fun. While the magic of nature is beautiful, the reality is that you may perish if you have not prepared yourself for basic human survival.

Do you know about edible plants and bugs, wilderness travel, building fires in all types of weather, identifying safe drinking water or hundreds of other skills and techniques to help you survive? If you answer 'no' to any of the above, this special issue of *Newsweek* was written for you. It combines outstanding international expert advice with personal experiences and stories to highlight tips you need to survive in the most dangerous conditions. It answers some of the most common survival questions and provides guidance on preparing for challenging outdoor experiences.

The natural world enriches our lives and there are hundreds of benefits to living off the land, but when you're confronted with a survival situation, you must be prepared to beat incredible odds to become a survivor.



—“SURVIVORMAN” LES STROUD

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ON THE COVER: Shutterstock-Digital Imaging by Eric Reintz.

ON THE BACK COVER: Jimmy Chin



underneath the kindling. This is my preferred method for several reasons: 1) it is a very stable structure, 2) the supporting fuel log can act as a wind-break and 3) larger pieces are immediately heated for quicker ignition.

Other fire-lays allow you flexibility for your situation, such as the **"STAR" (2)** campfire. In the star set-up, logs are arranged in a radial fashion and provide the same benefit as a lean-to, but with the added advantage that the logs can vary in length so they can be pushed into the center as they are consumed. This fire-lay comes in handy when you are caught without an ax or are otherwise unable to cut the logs into shorter lengths.

Another adaptable fire-lay is the **"BUNDLE-UP" (3)**. It can be made without tools using broken pieces of wood, which you wrap together with vines, cording or wire. Longer pieces are placed on the outside, so it creates a bowl for a mound of kindling and tinder. Binding the bundle low allows for the longest burn time. The big advantage of the bundle-up is that it raises the fire off the ground, making it extremely useful in watery areas.

Even if you get a fire started, weather and wet conditions can kill it fast. In snow or swamps, I suggest building a fire-proof platform of green logs and soil. In rainy regions, a thatched roof or large, flat rocks positioned above the fire-lay can act as an umbrella. In windy conditions, a trench can keep your fire aerated but out of the way of gusts. An alternative in windy conditions is a **"DAKOTA HOLE" (4)**—a U-shaped burrow that has two openings on the ground surface that connect below. The fire is built in one of the openings and will draw the air it needs to sustain it through the adjoining hole. When fire is needed on a wooden structure like a deck or floor, a thick earthen pad made of soil can be constructed as a makeshift hearth to preserve the structure.

In all of these cases, safety measures should be taken when building a fire, and I always advocate having an open container of water close by. In a domestic situation, it's best to make a fire pit or hearth, and if you're on the move, when you're ready to move on, make sure the fire is completely extinguished and follow the ethics of "leave no trace."

# 7 Things I Learned from THE BEDOUINS

The nomadic tribe has nailed bedding down in the desert.

**T**HE BEDOUINS, Arabic-speaking nomadic peoples who have endured since the seventh century, populate some of the world's hottest places, including the deserts of North Africa, the Arabian Peninsula, Israel, Iraq, Syria and Jordan. 160,000 live in the Negev alone. In fact, *badu* is Arabic for desert. Though relatively small in population, Bedouins hold sway over a disproportionately large land area, great swaths that most find too unrelentingly scorching to settle in. There's much these nomads can teach us about weathering inhospitable heat.

## 1. They know the sun is colorblind.

A seminal study published in *Nature*, in 1980, "Why Do Bedouins Wear Black Robes in Hot Deserts?" revealed the method behind their sometimes goth-like getups. "It seems likely," the scientists wrote, "that the present inhabitants of the Sinai, the Bedouins, would have optimized their solutions for desert survival during their long tenure in this desert.... We have therefore investigated whether black robes help the Bedouins to minimize solar heat loads in a hot desert." After measuring a volunteer "standing facing the sun in the desert at midday while he wore: 1) a black Bedouin robe; 2) a similar robe that was white; 3) a tan army uniform; and 4) shorts" in temperatures from 95°F to 115°F, "the amount of heat gained by a Bedouin exposed to the hot desert is the same whether he wears a black or a white robe. The additional heat absorbed by the black robe was lost before it reached the skin," posited the findings. The looseness of the Bedouins' robes lets cooling happen through convection: by a bellows action, as the robes blow in wind, or by a chimney effect, as the air rises passing over the skin.

## 2. Their view on backyard gardens is expansive.

Most Bedouins are herders, gravitating toward the desert during the rainy winters. They keep their camels, goats or cattle on the move to keep them in pasture. But they also plant grain along regular migration routes to harvest on the return trip.

## 3. They have a shelter to cover every season.

In summer, portable tents allow the flexibility to move at a moment's notice. At wintering grounds they return to annually, stone houses are common.

## 4. They know the ins and outs of weaving.

On the shadeless plains and mountains of the Sinai and Wadi Rum, where temperatures can spike above 120°F, the tents are crafted of coarsely woven goat hair. The open weave acts like a breathing membrane, letting heat dissipate. As the sun beats down on the black fabric, hot air is drawn upward through the tiny openings in the weave, creating the near-equivalent of a breeze.

## 5. They're masters of shade.

The tents' black color maximizes the creation of deep shade, but the coarse weave lets in just enough sunlight to illuminate the interior.

## 6. They're prepared for precipitation.

When it rains and snows, the woven fibers swell, closing up the tiny holes created by the coarse weave and making the tent watertight.

## 7. They build with adaptability in mind.

The tent's southern and northern sides are at a fixed angle, but the western wall is flexible enough to be pulled all the way up or clamped to the ground when wind or dust kicks up. The eastern side falls straight from the roof to the ground, offering protection from rain and strong gusts.

# A Place Out Of THE SUN

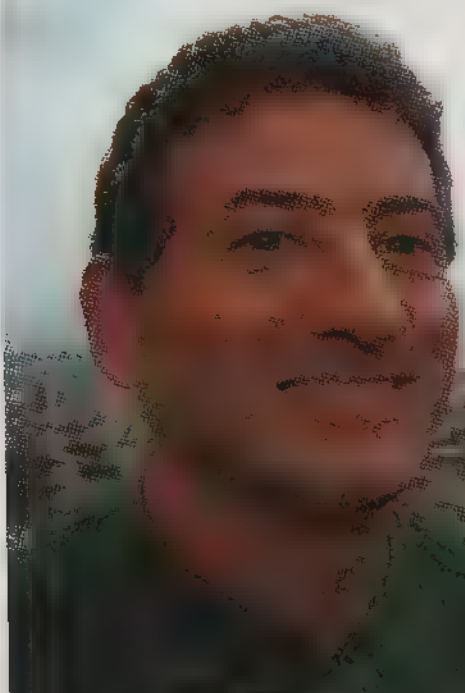
In a radio-free zone in the shadow of Green Bank Telescope, a community thrives off the grid.

**I**F GOOD FENCES make good neighbors, the Green Bank Observatory is the best neighbor of all for those longing to go off the grid. It dwells in the heart of a 13,000-square-mile U.S. National Radio Quiet Zone created to make sure that the Green Bank Telescope—the world's largest fully steerable radio telescope—can operate without interference. Sounds from space can be rather faint, and noise created here on Earth can obscure them. In Green Bank, West Virginia, citizens can enjoy the same lack of interference, without the clutter of anything that uses electromagnetic radio waves, from cell phones to wireless clocks to remote-controlled garage doors to Wi-Fi. The ban's not a problem for Green Bank's citizens: It's a boon. "We enjoy coming here where we don't have people say, 'Give me your cell phone number.' Do you have Facebook? Do you have Twitter? No we don't," Green Bank resident Linda Ramsden told *The Atlantic*.

Those self-diagnosed as "electrosensitive"—a condition where sufferers attribute nausea, headaches and even seizures to the use of electronic devices—have been flocking to the hamlet in recent years to escape the digital world, too. Since the scientific community doesn't acknowledge their ailment, they've taken treatment into their own hands and gotten out of Dodge altogether. The radiation refugees have a community about 150 strong so far. "Life isn't perfect here. There's no grocery store, no restaurants, no hospital nearby," local Diane Schou told *Slate*. "But here, at least, I'm healthy. I can do things. I'm not in bed with a headache all the time."

Radio-sensitive or not, there's an allure to going off the grid in a place like Green Bank for those who don't want to go it alone: A built-in community of like-minded folks, living with minimal electricity and access to only a pay phone in case of emergency. The town is tucked between a few national forests and is therefore protected from development. There's not a cell phone tower for miles, and the town's position in an Allegheny Mountain valley keeps random stray radio waves from getting in. The Green Bank Telescope folks are serious enough to have a surveillance team do recon to hold Green Bank's 610-person population to maintaining complete radio silence. "Everyone that lives here has to sign a form stating that they will not own a microwave, or a wireless telephone or Wi-Fi. Just about anything that uses electricity could potentially cause interference to our telescopes," radio frequency technician Jonah Bauserman, who patrols the area in a truck outfitted to detect rogue radio frequency transmissions, told *The Atlantic*. The infrequent rulebreakers are simply asked to turn the offending electronics off.

For the half-century since it's been built, the observatory has proven a success, both for science and for its neighbors. "We've been able to peer back to just after the Big Bang, 13.9 billion to 14 billion years ago," Michael Holstine, operations manager, told *Governing* magazine. "We need quiet to gather all the signals that are being supplied to us by the universe. Green Bank is just about the quietest place in the country." For those looking for absolute aural peace, it all sounds pretty great.



#### POWER PLAY

T.H. Culhane demonstrates a biomass reactor that converts waste to energy at Alemão Verdejar Favela, a shantytown without access to a traditional energy grid, on the outskirts of Rio de Janeiro in spring 2014.

# Human(fure) ENERGY

National Geographic emerging explorer T.H. Culhane talks about harnessing the power of poo.

#### Break down your take on trash and poop.

In the field of industrial ecology, the mantra is that, in nature, there is no waste. And we are a part of nature. Everything we produce is a material. We produce energy and matter and it comes back around and is transformed into something else. My insight is that we are almost self-contained biospheres. We're pulling materials into our nests and then we're excreting—if you like—urine, fecal matter, sweat, lemon peels and banana peels

and avocado pits and onion skins and the food that we didn't eat that was still on our plate. My study is harvesting this stuff that other people have ignored.

#### What is biogas and what's so cool about it?

Biogas [fuels like methane produced by the breakdown of organic matter] is the most ancient simple hydrocarbon. It's what dominated the Earth's atmosphere when this planet began. There's methane everywhere in the universe, but

Earth was almost completely dominated by methane until microbes began to produce oxygen. At that time, the methane-producing organisms went into hiding because they can't stand oxygen—it's a poison to them. So they went down into ocean sediments and deep into rock and that's why we have so much natural gas; they're still there, churning, making the stuff. And we have them living in our guts, in our intestines, in our stomachs, and so does every multicellular life form.

It's tied down with rocks or dug under the snow in a way that, if the weather gets really, really bad, you've got a safe place to weather the storm, and it's not gonna blow away when you get out to go to the bathroom. A classic thing that happens to first-time winter campers is they'll build their camp, they'll throw all their gear out around the tent and then overnight it snows two feet. And chances are you've probably been able to find your big things, but you've lost your mug, and you've lost your knife. All the small things have disappeared.

**What is more important—the right camera or a cool head?**

You can plan everything, but sometimes the best photographs are spontaneous. In order to capture that, you need to make sure certain things are taken care of so that you can actually be in a position to be creative. You need to understand the challenges, where the action's gonna happen, when it's gonna happen and be ready for something spontaneous to happen, as well. A lot of that also involves training—being in good shape, being out enough. I need to spend quite a bit of time in the mountains when I'm not shooting to maintain that edge, that focus and that familiarity. And, physically, I need to be in the kind of shape where I'm not exhausted all the time chasing down whoever I'm shooting.

**What's the most scared you've ever been?**

I've had quite a few near misses, but being caught in an avalanche was probably the most prolonged

experience. I went down 2,000 vertical feet. It's not often you have the conscious experience of thinking that, "Oh, this is how I'm going to die." You realize it's finite, and you have only so much time on the planet, and what are you going to do with that time? So, I think it's a good experience if you survive it.

**Where were you?**

I was in the Tetons, in Jackson, Wyoming, and we had just finished filming, and we were heading out of the mountains and kind of let our guard down a little. We made an assessment of the snow pass, but, obviously, we made some miscalculations. I was with a very experienced team, so it wasn't from lack of knowledge. It was just one of those things where sometimes you're allowed to make a few mistakes and it's fine, and sometimes there's a situation where one miscalculation can ruin your day.

**Did you do anything in particular to make it out?**

You're told that you're supposed to fight your way out. You have to try to stay above the debris. This was a Class 4 avalanche, so there wasn't much chance to do much about it. It was massive—the entire side of the mountain came down and funneled and then it eventually opened up and the debris spread out at the bottom. I was really lucky that I got pushed out to the top of the debris. A lot of people die from trauma— from hitting a rock or a tree, or getting torn apart. You can be in a really small avalanche and that can happen. You can be in a really small avalanche and

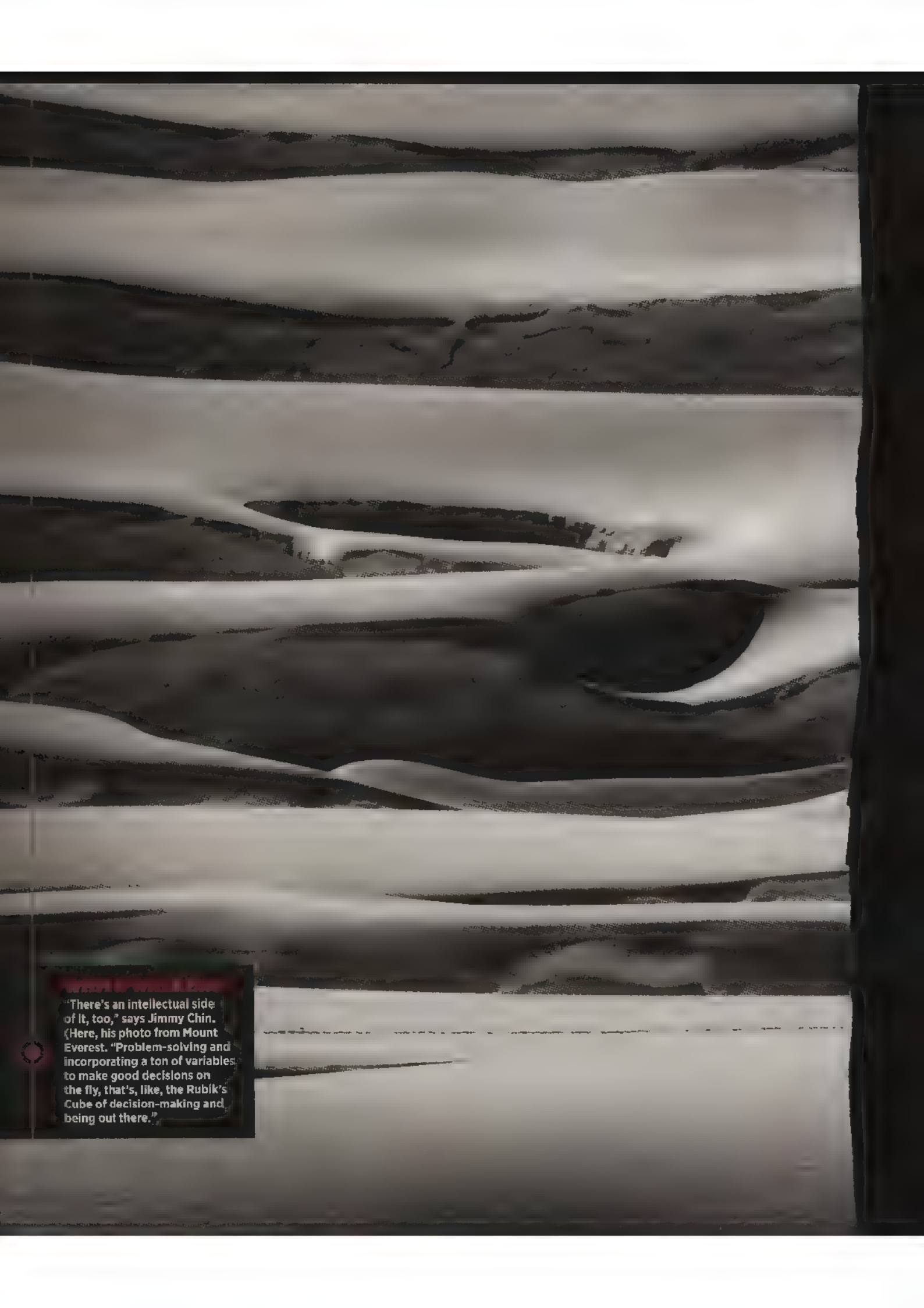
be covered with just six inches of snow and asphyxiate. I easily could have been buried under 25 feet of snow. But, somehow, I ended up on top of the slide when it stopped. But during the course of the avalanche, I was, at certain points, under 10 or 20 feet of snow, and I felt like I was gonna get torn apart. I mean, you're getting pushed around by the weight of buildings. Or maybe not buildings, but like 200 buses—maybe more like 1,000. I don't even know. The debris field at the bottom was 1,000 feet across. Hundreds of thousands of tons of snow.

**Do you always have a little bit of fear on a shoot?**

Well, fear is built into us for a good reason. But there's healthy and unhealthy fear. There's fear that's debilitating. That doesn't help you. There's fear that is irrational. There's fear that is based on perceived risks, which are different than real risks. Fear is meant to keep you alive, but shouldn't dictate your decisions.

**What drives you to go on that next assignment?**

I think everybody has that drive to push themselves and see where they land. You wanna have that satisfaction of doing something challenging. Some of it's as simple as being in a really beautiful place. Some of it has to do with the physicality and the experience of pushing my body. Some of it is purely emotional, in the satisfaction to accomplish a goal that I set out to do. When all of those things come together there's a level of heightened awareness and purpose that is really insatiable for me.



**WILLIAMSON**  
"There's an intellectual side of it, too," says Jimmy Chin. (Here, his photo from Mount Everest. "Problem-solving and incorporating a ton of variables to make good decisions on the fly, that's, like, the Rubik's Cube of decision-making and being out there.")

**A** **BASIC RULE** of survival situations: Don't immediately exhaust yourself coming up with a shelter. Despite common belief, shelter isn't at the top of the list of essential needs according to top survival experts—fire is. In snowy or windy conditions, shelter can shoot to second, however. And in any situation, establishing a shelter can go a long way to providing peace of mind. Foxes have fur, geese have down. "A lot of animals don't need shelter, but we do," says Ray Mears, survivalist and founder of Woodlore, a school that teaches bushcraft. But humans have to be smart about it, too. "We have to have an intellectual response to our environment," adds Mears. The key is coming up with an ad hoc asylum that suits your situation and doesn't drain your internal battery.

#### Wood is Good

An abundance of wood, particularly dead branches and other foliage you can easily gather off the ground, can indicate a good shelter site. "Regardless of the environment, most people seeking shelter in the wild are injured and hypothermic," says Tony Nester, who has helped train military special operations units in desert survival and currently works as an instructor for Ancient Pathways survival school in Arizona. By selecting a spot where you can gather all the material you need to build your structure and fuel a fire, you conserve precious energy and increase your chances of survival.

#### Get High

Nester suggests you avoid setting up camp in the bottom of a valley or any other low area. Flash floods and other drainage can easily annihilate structures built on these sites. Avoiding areas of low elevation will also help you avoid hypothermia. "It could be 25 degrees at the bottom of a little meadow and 20 degrees warmer just a couple of hundred of yards farther up," says Nester.

#### Keep Liquid at Arm's Length

When searching for a suitable site, keep your eyes peeled for bodies of water, such as a lake or


creek. Beyond the obvious benefit of staving off the specter of dehydration, water sources tend to teem with wildlife such as fish and land animals attracted to the life-giving resource. But avoid the mistake of giving your shelter a waterfront view, adds Mears. Insects tend to congregate there. Plus, if you camp out right next to the river, "you're going to wake up covered in dew," says Mears—and a wet body is a cold, potentially hypothermic body. "You can tell if the spot you've chosen sits above the dew line by feeling the soil and assessing the ground's dampness."

#### Think Small

When it comes to constructing a shelter, size matters. Trying to build a wigwam big enough to house a family of five will leave you not only exhausted but with a shelter too large for your body heat to warm efficiently, says Nester. Think of it more as fashioning a glorified nest for yourself. One option Nester offers is a simple hut of natural debris and wood with a hollowed-out space just large enough for you to fit in. Then let your body heat get to work. According to *Field & Stream*, more time, energy and expertise can garner you a lean-to made by lashing together wood to form a large square that you can lean against a log or partly-fallen tree to protect you from wind and rain while trapping the heat of your fire. Double the lean-to and lash it together and you get an A-frame, the go-to shelter of Les Stroud, a.k.a. Survivorman. "It's a very adaptable shelter to just about any situation," Stroud says.

#### Expand Your Idea of Shelter

If you don't have the time or ability to construct a shelter, shimmying into a large hollow log or tree can serve in a pinch, says Mears. Just remember, warns Nester, that any natural spot which strikes you as a good place to get out of the elements probably looked that way to other creatures as well. These can range from annoying to deadly, depending on your location. "Your body heat starts to wake up creatures in the ground laying dormant," he says. "Rock piles in the southwest are notorious for harboring scorpions and rattlesnakes, for example."



# The Quest for **FIRE**

**A primer on creating and sustaining a campfire  
with Survivaltek's Ken Youngquist.**

**S**TARTING A FIRE is one thing. Keeping it going is another. You need to know how to achieve both. A successful campfire, or fire-lay, is the one sure thing that can keep you warm, cook your food and sanitize your water. Assuming you've brought a fool-proof source of flame with you (and two or three more for backup), having a sound basis of construction and suiting it to the situation can help you overcome adverse fire situations like wet, wind or lack of a hatchet.

The key to sustained combustion starts with building your fire-lay correctly. When creating a campfire, it should be a progression of thin to thick flammable material—from tinder to kindling to fuel. Tinder might be dry grass, leaves or twigs; kindling might be pencil-size branches; and

fuel might be arm-size branches or larger logs. Because heat rises along with the flames, stack the tinder at the bottom and kindling above it. Once the fire is established, stack your fuel next to and over the flame. The materials should be placed close enough to transfer heat but loosely enough to allow air flow. Be aware of the condition of your building materials, too. Dampness, in the form of rain- or dew-soaked twigs, branches and leaves, inhibits ignition. Look under logs or under a tall pile of leaves for dry materials. Small, dead branches on tree trunks often work well. In extreme circumstances, you may have to cut into the heart of a dead log in order to find suitable dry wood.

My go-to fire-lay is called a **"LEAN-TO"(1)**. Begin with a log laid on its side as a prop to hold up the kindling leaned against it. The tinder goes



#### THYME

Like rosemary, it's a decongestant when boiled in water, but is mostly known as a digestive aid that works by relaxing the smooth muscles in the colon.

#### CLOVE CAPSULES

A known combatant of ingested e. coli, clove capsules are an effective antidote for food poisoning. Take one at onset and another if symptoms continue.

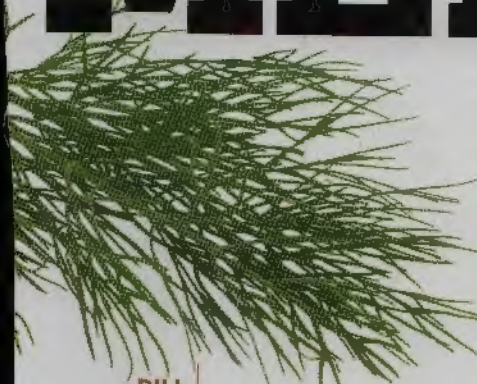


#### ROSEMARY

Fresh or dried, the herb acts as a decongestant when boiled in water, with the ability to break up phlegm. It's also thought to improve memory.



# MEDICINE



#### DILL

Nicholas Culpeper, a 17th century herbalist, called this digestive aid and anti-gas agent "a gallant expeller of wind."



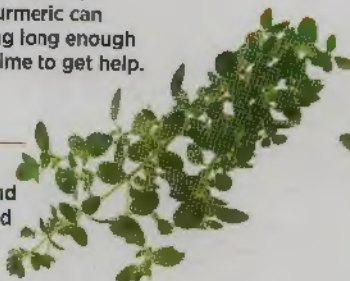
#### CANNED FRENCH-STYLE GREEN BEANS

For a burn: douse it with cold water, apply the green beans, then pour the liquid from the can over the burned area. Hold for 15 minutes in a towel and repeat.



#### TURMERIC

Like cayenne pepper but without the heat, when packed into a wound, powdered turmeric can stop bleeding long enough to buy you time to get help.



#### OREGANO

Like garlic and its fellow herbs sage and basil, oregano should be eaten liberally to reap its antibiotic, antifungal and anti-parasitic properties.

#### CLOVES

Fresh clove can preserve pork. After dinner, clove oil keeps the dentists away, helping prevent halitosis, tooth decay, cavities and toothache.



# What's in your BUG-OUT

**Creek Stewart, author of *Build the Perfect Bug Out Bag: Your 72-Hour Disaster Survival Kit*, makes sure you have the essentials covered for a three-day emergency escape.**



## SHELTER

The "survival rule of three" goes like this: In extreme conditions, you can live for three hours without shelter, three days without water and three weeks without food. Shelter is the most important category in any disaster survival kit, so it needs to be done right. I'm always in favor of a lightweight backpacking tent. They're typically very durable, very functional and they take care of all your sheltering needs. The triad of hypothermia is cold temperatures, wind and moisture. So whenever you can eliminate one or more of those three, you drastically increase your chances of survival. I've always been a big fan of tents like the REI Half Dome 2 Plus Tent (\$159.93 at [REI.com](http://REI.com)). I also always recommend carrying a backup shelter that could be repurposed as a ground covering or an improvised survival canopy.

## FIRE

I personally consider fire-making the most important survival skill because it can make up for inadequacies in other areas. Even if you have a crappy shelter or don't know how to build one, fire can help you make up for that. The great news about fire tools is they're small and inexpensive and easy to use. Number one on that list is a disposable Bic lighter. In fact, carry three of them. They're a dollar, they weigh nothing and they're very easy to use. Also, a metal match. It doesn't create an open flame but it does create sparks that burn in excess of 2,000 or 3,000 degrees Fahrenheit. Your number one tinder is virtually free and you can make it at home—it's cotton balls or dryer lint mixed with petroleum jelly or Vaseline. It's the best fire-starting tinder on planet Earth, hands down.



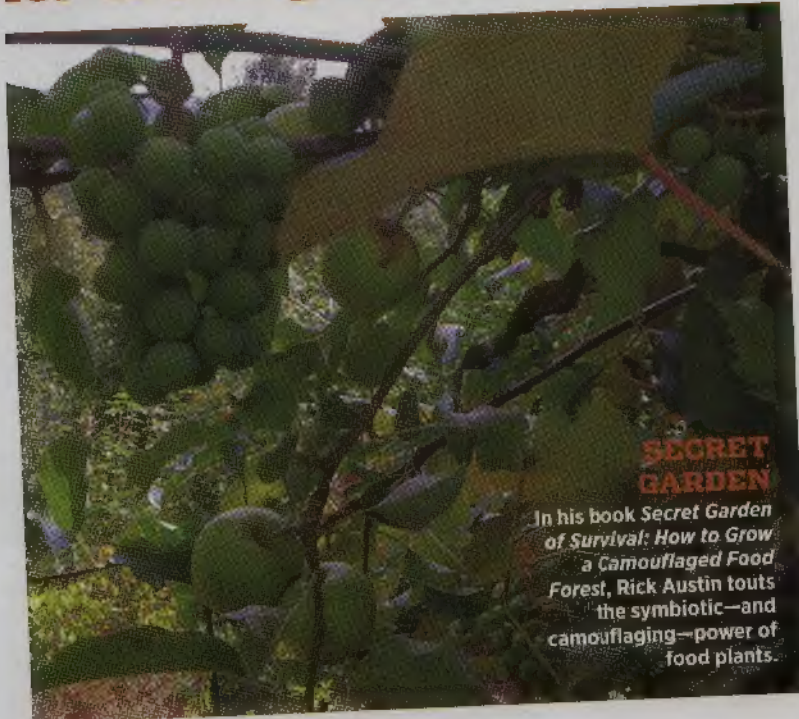
## THE BAG

Your bag doesn't have to look like it belongs on the front lines as long as it's waterproof and has plenty of storage, like the Maxpedition Vulture II, (\$145.99 at [Walmart.com](http://Walmart.com)). A lot of people are overwhelmed because they feel like they can't finish. Your bag doesn't need to be finished, but it's important to get started and have something in place.



CLOCKWISE FROM TOP LEFT: COURTESY REI; COURTESY MAXPEDITION; COURTESY CUCINA AND AMORE; COURTESY POTABLE AQUA; COURTESY CLIF BAR & COMPANY; SHUTTERSTOCK; COURTESY NORTH AMERICAN RESCUE; COURTESY MCNEIL; COURTESY EPIPEN; COURTESY TORNAADO PERSONAL DEFENSE SYSTEMS; COURTESY BIC; COURTESY KINGZIER; COURTESY VASELINE; SHUTTERSTOCK

## Prepper Rick Austin's Tips for Growing Hidden Grub



**I**MAGINE A garden you plant once. It takes up very little space and grows five times more food per square foot than a traditional garden—and it's all disguised to look like overgrown underbrush. Here's some ground rules for creating your own Secret Garden of Survival:

### Opt Out of Vegetables

In a situation where there is no electricity, no refrigeration, no supermarkets, no seed stores, no fertilizers and no pesticides, it makes sense to look at people who managed to live successfully for generations without them. Studies of indigenous peoples around the world showed that they have lived primarily on perennials (plants like grapes and apple

trees that grow year after year without replanting) as opposed to annuals (such as typical grocery store vegetables like carrots and cucumbers) that have to be replanted each year.

### Grow Roots

Perennials have time to put down deeper roots, which enables them to get more nutrients and reach water deeper in the soil. It also makes them less susceptible to seasonal variations in sunshine, rainfall, cold and heat than annuals.

### Forego Rows

In nature, plants don't grow in rows and don't need to be cultivated, trimmed, weeded or doused with pesticides. And nature has been growing fruits, nuts, berries and herbs successfully for millions of years.

### Exploit Symbiosis

When growing naturally, plants are often symbiotic. Plants grow—some taller, some shorter—in a way in which all plants get adequate sun, air and rain. They often share nutrients and natural pest control; they sometimes grow in concentric circles where the tallest plant (often a fruit or nut tree) provides shade for shade-seeking plants and creates a natural trellis for vine foods like grapes. Outside the shade ring, a layer of shrubs like blueberries and blackberries can grow. Outside of that circle of shrubs, herbs can grow—which have the added benefit of attracting insect pollinators and predatory wasps, which may feed on “bad” bugs, providing a defensive perimeter around the fruit, nuts and berries that bad bugs cross at their own peril. Finally, around the herb layer is a lower level of ground cover, which accumulates nitrogen, a natural fertilizer, and it makes available to the other plants.

### TEOTWAWKI Proof

Because we are growing in three dimensions, the garden can produce five times more food in the same space as a traditional garden and is almost no work to maintain compared to gardening with annuals. In a doomsday scenario, preppers are going to have enough work to do without tilling the field. And because these plants all grow together—and in some cases are intertwined—it looks more like overgrown underbrush than a food supply, which camouflages the garden from would-be marauders.